The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Root's Gas Exhauster for Blast Furnaces.

The blower and exhauster shown in the accompanying engraving, which is taken from *Engineering*, is calculated to displace 125 cubic feet of gas per revolution, and, when running at the ordinary speed of 130 revolutions per minute, will deliver 1,000,000 cubic feet per hour. The cover or casing is built up of wrought-iron plates, and is made of sufficient strength to resist the force of a gas explosion, while malleable iron relief valves are fixed upon each side of the machine. The end plates are 1¼ inches thick, and are secured together with angle irons and tie bolts. The revolvers are constructed principally of wrought iron, and are mounted upon mild-steel shafts 8 inches in diameter in the body. These shafts run in long adjustable phosphor-bronze bearings of special construction, so that they are readily accessible, and can be adjusted instantly. The revolvers are geared at one end with strong flanged wheels, and are accurately balanced. The engine is mounted upon a massive bed-plate 15 inches deep, in which a steam cylinder 18 inches in diameter is fixed securely. The piston-rod is made hollow, of mild steel, and is secured to a crosshead built up of steel plates. To this crosshead are attached the two connecting-rods. The crank disks are balanced and fitted with steel crank pins. This apparatus is designed to draw the waste gases from the top of a blast furnace, and to force them into a condenser in connection with the McCosh and Angus process for the recovery of by-products. One set is being fixed at Gartsherrie and the other at Muirkirk, and their working is expected to aid in demonstrating the practicability and economy of the process. It may be well to here state that these machines have been constructed according to Messrs. Thwaites Brothers' (England) latest patent, the result of 20 years' experience in this class of machinery.

A Proposed Method to Reduce the Consumption of Fuel in Blast Furnaces.

BY P. H. BROUN.

The metallurgy of iron is at present certainly one of the most wasteful of all chemical operations. Even under the most favorable circumstances more than one-half of the calorific value of the fuel is lost in the furnace proper. It is very true we drive our engines and heat our blast with the escaping gases, but if we had more perfect chemical reactions taking place in the furnace, the quantity of coal would be much diminished; hence our engines could be made much smaller, as the amount of blast necessary would diminish in a corresponding ratio to the amount of coal consumed. No chemical operation is so largely practiced as the extraction of iron from its ores, and yet there is no branch of industry for which science for many years past has done so little. That gigantic piece of apparatus, "the blast furnace," certainly deserves a more careful scientific investigation than has ever yet been given it. There is one question, a satisfactory answer to which will probably serve to throw much light on the chemistry of the blast furnace, and may result in some radical changes in our present ideas as to how a blast furnace should be worked. The question alluded to is, To what shall we attribute the advantages of charcoal over other forms of fuel in the furnace?

It is an undeniable fact that a given weight of carbon in the form of charcoal will produce more iron than the same weight of carbon in any other form. This apparent anomaly has been theorized upon to a very great extent. The hypotheses presented are of two general kinds, as they come to us from scientific or from "practical" men. The theory of the scientific class is based upon the chemical reactions that are known to take place in the furnace. They hold that this superiority of charcoal is due to its quick and thorough reduction of CO_2 to CO. Practical men, on the other hand, seem unanimous in thinking that the high consumption of the more dense fuels has some dependence upon their slower rate of combustion. These theories may both be correct, but it can certainly be remarked that they are very general and need some modification in order to be readily comprehended. The theory of scientific men, as stated above, is also often brought forward to account for the high fuel consumption when using the more dense fuels. The theory can hardly hold in the two cases. The theory of the practical men, on the other hand, seems somewhat at fault, for if we had a form of carbon in front of the tuyers that united very readily with the oxygen of the blast, the other conditions remaining the same, I think it more than likely our ore would be melted down before it was perfectly reduced, and the cinder would then carry off a considerable quantity of iron.

Two experiments performed by Mr. Bell throw so much light on the actual condition of things in the reduction zones of blast furnaces that I will give his figures: Exp. I.—20 grains of calcined Austrian spathic ore mixed with 7 grains of powdered charcoal were exposed for 50 minutes, at a bright red heat, to a current of 64 vols. of CO and 36 vols. of CO_2, about 3 liters of the gas being passed over in the time.

The charcoal lost 1.54 grains = 22.0 % of C.
The ore lost 2.316 grains = 46.2 % of O.

ANALYSIS OF ISSUING GAS.

	CO.	CO_2.	In the first
100 vols.	35.7	64.3	10 minutes
	70.7	29.3	30 "
	73.0	27.0	50 "

Exp. II.—20 grains of calcined Cleveland ore, mixed with 8 grains of coke, were treated in the way just described.

The coke lost 0.405 grains = 5.0 % C.
The ore lost 0.781 grains = 22.3 % O.

ANALYSIS OF ISSUING GAS.

	CO.	CO_2.	In the first
100 vols.	36.0	64.0	10 minutes
	56.0	43.3	30 "
	55.0	45.5	50 "

In the first stage of experiments I and II we see that the ore has had a much stronger oxidizing effect upon the gases than the charcoal or coke has had reducing effect, but from this stage on the charcoal and coke show a stronger reducing effect upon the gases than the ore an oxidizing effect.

MM. Debray and Bell have shown by numerous experiments that ferric oxide (Fe_2O_3) can very readily be reduced to ferrous oxide (FeO) by a mixture of equal volumes of CO and CO_2, but after this oxide is reached all further reduction stops. Moreover, when this mixture of gases is passed over metallic iron at a strong red heat ferrous oxide (FeO) is the result. Thus we see that while Fe_2O_3 parts with an atom of its oxygen very easily, with the formation of FeO, the ferrous oxide holds its oxygen much more tenaciously. These experimenters have further shown that even a small quantity of CO_2 will deteriorate very markedly the reducing power of CO.

From these facts I think we are justified in dividing the reducing zones of the blast furnace into three stages. The first stage will be near the top of the furnace, where the greater part of the ore will be reduced to the ferrous oxide (FeO). The second stage will begin at a point just below where the ore is reduced to the ferrous oxide, and its continuation downward will vary with circumstances, but while the ore is passing through it no further reduction will take place. This stage we will call dormant. The third stage will not be far from the zone of fusion, and here the reduction of the ferrous oxide (FeO) to metallic iron will take place.

Experiments I and II alone would suggest the existence of a dormant stage in the furnace. For in the experiment with coke it will be seen that it was sluggish in its action upon CO_2, and certainly would have been more so had the gases been largely diluted with nitrogen, as they are in the furnace. We learn also from this experiment that coke aids the gases very little in effecting the reduction of the ore until a very hot point in the furnace is reached.

The composition of the furnace gases at a very considerable depth shows that they are incapable of perfectly reducing ferrous oxide (FeO), and as the coke at this point has not a sufficiently high temperature to assist in the reduction, the ore must necessarily pass down in the furnace until a point is reached where the coke has the requisite temperature for the rapid conversion of CO_2 into CO.

If the existence of a dormant stage in the furnace is admitted, the reason for the superiority of charcoal over other forms of fuel at once becomes apparent. In experiment (I) it will be seen that the reduction proceeded much further than in the coke experiment, and this can be due solely to the greater power of charcoal than the more dense fuels to convert CO_2 into CO at low temperatures. Hence the dormant stage through which the ore passes in the charcoal furnace must be of very short duration.

The superiority of charcoal then must depend upon its greater power to cause this reaction than other forms of carbon, and by this reaction it has diminished the time between the two steps in the reduction of the ore—that is to say, the time that intervenes after the ore takes the ferrous state until it is finally reduced to metallic iron. I do not wish to convey the idea that there are distinct zones in the furnace where the different oxides are reduced; but as soon as the ore enters the furnace we have all the necessary conditions for its rapid reduction to the ferrous oxide (FeO). The temperature is sufficiently high, and the gases contain even a larger percentage of CO than is necessary for this reduction. But we do not have the conditions for the perfect reduction of FeO into metallic iron in furnaces using coke and coal until the fusing point is attained. Of course, the greater part of the ferrous oxide will be reduced before this point is reached, as there is a very small percentage of CO_2 present at this point in the furnace. At a depth of 52 feet from the tunnel-head of a coke furnace 80 ft. high, Mr. Bell found, however, that the calcined Cleveland ore exposed two hours only lost 81.0 per cent. of its oxygen, the amount of CO_2 at this point being very small. More or less metallic iron would certainly be formed at this depth in the furnace, but we would have no guarantee that this iron would reach the fusion zone without being alternately oxidized and reduced an infinite number of times. Thus we see that while the first step in the reduction of the ore is a perfect one, the second is very far from being so. The large consumption of fuel in the blast furnace is undoubtedly principally due to the imperfect way in which the ferrous oxide (FeO) is reduced.

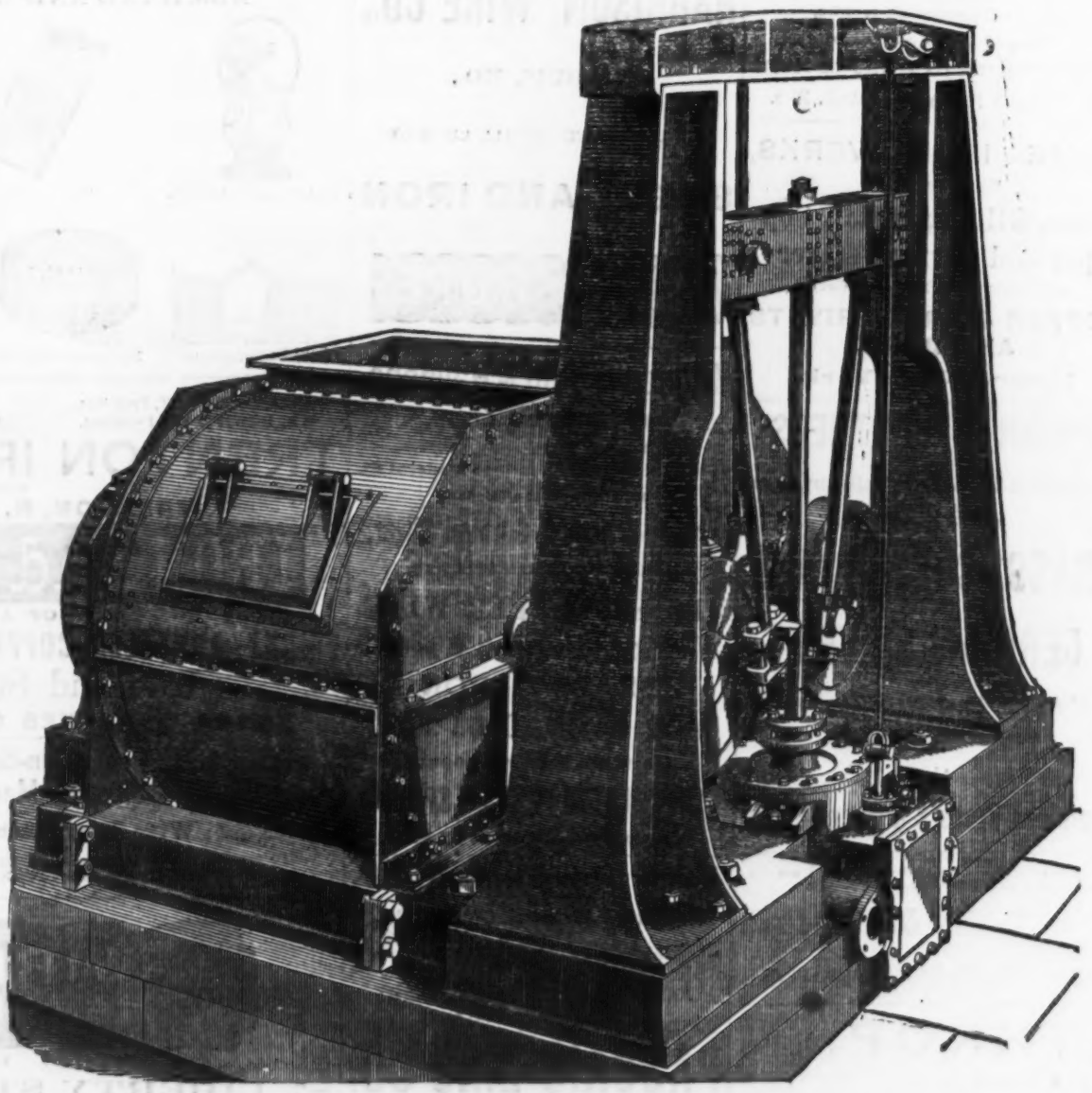
There appears to me to be a way by which we may at least partially avoid the dormant stage in the furnace. I must admit, however, that I have considerable hesitation in advancing this idea, as I am well aware that it is rather at variance with the ideas held by many at the present time in regard to the economical running of blast furnaces. It is generally believed that the high carbon consumption of our furnaces is due to the reaction, $CO_2 + C = 2\,CO$, taking place and carrying a large percentage of carbon out of the furnace as CO. To obviate this, the great majority of blast-furnace managers try to select a fuel that will resist this reaction as far as possible, and yet they admit that charcoal works more economically in a furnace than any other kind of fuel. At the same time, no one can question the fact that charcoal converts CO_2 into CO far more readily than the more dense fuels. Now, what I propose is to give the fuels of the blast furnace the greatest possible energy for a rapid conversion of CO_2 into CO after a certain stage in the furnace is reached, and the simplest way to effect this is to increase the temperature of the fuel.

If a blast of air were introduced in the furnace at a point just below the point where the greater part of the ore has been reduced to the ferrous state, and the quantity of this blast so regulated as to give the carbon present the requisite temperature for the rapid conversion of CO_2 into CO without allowing the temperature to become so high as to produce cinder, a two-fold advantage would be gained. In the first place, time would be saved, the dormant stage would now become active, and the metallic iron once produced would stand a much better chance of reaching the fusion zone without undergoing alternate oxidations and reductions. The second advantage would be a smaller consumption of fuel. During the second stage of reduction in the blast furnace an enormous volume of CO passes over the ore while it is making its descent through the greater body of furnace, and is unable to effect perfect reduction of the ore on account of the presence of a small quantity of CO_2. If we could destroy this CO_2, the ore would reach the fusion zone perfectly reduced, or nearly so, and the whole charge, moreover, would be more strongly heated when arriving at this point; hence fusion would take place more rapidly and with a smaller consumption of fuel.

The fusion zone is certainly the most critical point in the blast furnace, as it is here that the grade of iron is determined. In Vol. V, page 342, of the Transaction of the American Institute of Mining Engineers, Mr. Howe states that "the fall of temperature in the hearth is mainly or almost wholly due to the ores remaining too short a time in the reduction zone," for, should the ore reach the fusion zone not perfectly reduced, a greater or less quantity of CO_2 must be formed, as shown by the equation $FeO + CO = Fe + Co_2$. This CO_2, coming in contact with carbon at a very high temperature, will immediately be reduced to CO, and as this reaction is attended by absorption of heat, we should exclude CO_2 as far as possible from the neighborhood of the zone of fusion.

From the successful operations of Ferrie's self-coking furnace in Scotland (although it did prove a failure in this country), which is in principle nearly allied to my proposed amendment in the blast furnace, there is reason to believe that experiment will establish the correctness of the theory here advanced. In Ferrie's furnace the coke is rendered more energetic in its reduction of CO_2 at an early stage in the furnace, and the result has been to increase the production of iron and diminish the consumption of fuel.

MIDDLEBURGH, VA.



ROOT'S BLOWER FOR EXHAUSTING GAS FROM BLAST FURNACES.

Wages In Massachusetts.

At a time when considerable discussion has been aroused by Mr. Porter's letters in regard to the wages and condition of laborers in England, an important contribution to the discussion, and to economic science generally, comes in the annual report of the Massachusetts Bureau of Statistics and Labor. The report deals with the industries of Massachusetts alone, but gives the actual wages paid and hours of labor in each occupation for 2440 establishments and 207,793 persons employed. It will be noticed at first with regret that the report does not specially distinguish the number and wages of the men, the women or the children employed, and its statistics are therefore liable to create a false impression unless intelligently read in connection with some knowledge of the proportions of workers of the different kinds employed in the different branches of industry.

Out of the 207,793 persons employed, almost 60,000 were in cotton mills, and over 25,000 in woolen and worsted mills, 37,000 in boot and shoe establishments, over 18,000 in metal and metallic goods establishments, and over 11,000 in machine and machinery works. The workers in the latter concerns are mainly men and boys, and their wages average daily $1.61 for machine works and $1.45 for metal establishments. But the employees in cotton mills are mainly women and girls, and their wages average only 85 cents daily, the worsted mills 94 cents daily, and the woolen mills $1.04 daily. These are the extremes among the branches employing large numbers of persons, but the employees in printing and publishing establishments, being nearly all males and mostly adults, average $1.77 daily for 5227 persons, and the makers of musical instruments average $1.96 daily for 2821 persons. The building establishments average $1.69 daily for 5645 persons, and the carriage and wagon makers $1.68 daily for 1962 persons. The boot and shoe concerns pay an average of $1.41 daily to a large number of persons of both sexes and all ages, the "food preparations" establishments pay $1.58 daily to 2901 persons, the furniture concerns $1.56 daily to 3133 persons, the leather works $1.50 daily to 6703 persons, and the stone works $1.47 daily to 1370 persons.

When it is considered that a very large number of these employees are boys and girls, and not much less than a third of the whole are women—31,496 in cotton mills alone, according to the census, and 8210 in woolen, 3340 in worsted mills and 13,374 in boot and shoe establishments—it will be seen that the average wages for a family must be much higher than at first glance would be supposed. If the head of the family earns wages as a skilled mechanic, which range from $2 to $2.50 and upward in nearly all trades, or even as an ordinary laborer from $1 to $1.50 and upward, while the wife or one or two children also earn smaller wages in other employments, the income of the family will contrast very sharply with that of English families in similar employments. Then, too, there are good workers and poor in every occupation, and the general average includes the worst with the best. Where there are some who do exceptionally well, and make good wages if working by the piece, there are always many more who fall below the average and drag it down. Especially is this the case in a State like Massachussetts, where a large share of the workers in cities and towns are of foreign birth, and not many have the higher intelligence which free schools offer to most of the working people born in this country.

The value of time in all matters pertaining to writing and telegraphing is becoming daily of greater value, and in certain circles a great deal of attention has been paid to reducing the amount of labor necessary to send or write a given message, and consequently reduce its time. The stenographic idea has been applied to a very considerable extent in telegraphing, and contractions and various short-hand symbols, if the term may be permitted, have been used. By the use of abbreviations of this form in telegraphy, an otherwise impossible speed has been attained. It is recorded by one of the electrical papers that J. W. Cook sent from Washington to Cincinnati in five hours and five minutes a speech of Mr. Conkling's consisting of 20,000 words, which took more than four hours in delivery. The average was 4000 words per hour. This time has been beaten by Walter L. Prentice, who has sent 4600, and by F. N. Basset, who sent 21,000 words in 4 hours and 40 minutes.

The Monongahela Suspension Bridge, at Pittsburgh, Pa.*

BY COL. S. M. WICKERSHAM.

In order to have a proper conception of the construction of 38 years ago, in which time more than a generation of men have come and gone, it might be well to look into the then existing state of affairs bearing on the subject, and try to understand the difficulties which the engineer had to encounter, considered in respect to the resources at his command with which to meet them. At that time work in the shop was done principally by hand. The slide-rest was a novelty, and the straight-edge and steady eye and hand turned out the piston-rod. Screws were still cut in the lathe by hand. The whip-saw was used to cut the floor beams of the aqueduct in 1844. The trip-hammer was still doing its noisy work, afterward so effectually silenced by the squeezer. The canal-boat controlled the freight traffic between West and East, and steel was almost among the precious metals. But it would occupy too much time to go into this interesting part of the subtention to a simple narrative of events preject. I will therefore ask your kind acceding and leading to the construction of the Monongahela Bridge, and to an account of the method pursued in its building. I much regret being disappointed in obtaining some drawings which would have added interest to the description, so we must do without them.

Up to the beginning of 1845 the bridges throughout this country were built of wood, wood and iron combined, or of stone, a few of chain—all generally of short spans, wood being the principal material used. The bridges were generally for highways, for foot and wagon traffic. Although about 15 years had passed since the introduction of railroads, they had as yet not been extended very far. It was in 1845 that a company was formed to build a railroad from Harrisburg to Pittsburgh. It was in 1845 that a company was formed to build a telegraph line from Philadelphia to Pittsburgh. Here commenced the era of railroads, which from its necessities produced the present era of iron and steel bridges.

At Philadelphia, Pa., a wire suspension bridge had been erected, spanning the Schuylkill River, at Fairmount, at the expense of the county, by Chas. Ellet, Jr., C. E., who furnished the plan and contracted for the work at $50,000. The abutments and columns were of granite, the distance between abutments 343 feet, between the supporting rollers on the top of the columns 357 feet, and width of floor and foot-way, 27 feet. The wire was laid in 10 cables, five on each side of the bridge—each cable extending from anchorage to anchorage over the top of the columns, and were fastened at the ends around numerous stout iron bars transversely embedded in the solid rock or in an immense body of masonry—this formed the anchorage.

Each cable was composed of 260 No. 10 wires, forming a strand 2⅛ inches in diameter, weighing each 4 tons, and each being 650 feet in length. They were wrapped at short intervals with bands of wire. The cables laid in a horizontal plane; across the five cables iron bars were laid, to which were attached the suspending rods, which were composed of small wires aggregating an inch in area, which, hanging vertically, as did also the cables, were attached to the beams that supported the floor. This bridge was opened for travel in the spring of 1842. It was erected on the site of the wooden bridge built in 1818 by Lewis Wernwag, which was well known as being the longest single span wooden bridge in the world—343 feet between the abutments. It had succumbed to fire, the almost universal fate of wooden bridges. There was no element of stiffness in the Fairmount Suspension Bridge, and it was subject to great vibrations. It was very graceful and pretty to the eye, but very unsteady to the feet.

This method of construction had been severely criticised by Mr. John A. Roebling, and a controversy had arisen between these distinguished engineers, Mr. Roebling maintaining that suspension bridges could be built possessing elements of stiffness and rigidity by a proper combination of its own elements; that by laying the wires in cables of larger diameters, the stiffness of a solid bar could be obtained. Mr. Ellet held it to be impracticable to combine the wires into a cable of large diameter so that each wire would bear its proper share of the burden, and that therefore the wires must be laid in cables of small diameter, adding to their number as additional strength was required. So the contest rested until 1844, when Mr. Roebling contracted with the city of Pittsburgh to rebuild the aqueduct across the Allegheny River, connecting the Pennsylvania Canal with the basins within the city, which enabled him to introduce the plan of suspension bridges he had so contended for. There were seven spans in this work; there were two continuous cables made of No. 10 wire, B. G., each 1175 feet in length from anchorage to anchorage, 7 inches in diameter, formed of 1900 wires each, gathered into a round cable, and tightly and closely wrapped throughout with No. 14 annealed wire. The cable passed over stone pyramids on each pier and on the abutments, resting there on rollers. The suspension rods, passing over the cables, descended between the floor beams, which were put up in pairs, and block and washer below. The trunk was so made of two courses of 2½-inch plank crossing each other diagonally and held together by the side post and framing, as to be self-sustaining, so that the cable had really only to carry the weight of the water within it. The total weight of water in each of the seven spans when the canal was full was 295 tons; weight of one span, including all, 420 tons; average ultimate strength of each wire, 1100 pounds; tension of one wire, 206 pounds. Thus for the first time did Mr. Roebling introduce his system. But it was objected that the load in the aqueduct might be considered as constant, and the excess of strength was so great that many inequalities might exist and not become manifest for a long time, owing to the entire absence of vibration, and therefore it was not a solution of the point at issue.

The work on the aqueduct was drawing to a close; it was opened for navigation on May 22. When, on April 10, 1845, the bridge over the Monongahela River, at the foot of Smithfield street, Pittsburgh, which had been erected in 1818 by J. H. Johnson, after designs of Lewis Wernwag, was destroyed in the fire which, on that day, swept over the city, leaving 40 acres of ruins where in the morning had stood the principal portion of Pittsburgh's business houses, the blow was stunning, and for a time it seemed that it would be fatal to our prosperity. But soon the native energy asserted itself and the work of restoration commenced. The bridge company felt the necessity of re-establishing communication with the South Side, but were in no condition to incur any heavy expense. Every one seemed to be ruined, and it was questionable whether the needed funds could be raised; the cost of erecting the bridge was an important consideration. Mr. Roebling seized the occasion to make and offer a plan and estimate for a wire suspension bridge, in which the abutments and seven dilapidated piers of the burnt bridge could be utilized, and having all the mechanical appliances required in the execution of the work, together with the skilled and unskilled workmen still with him at the aqueduct, determined not to miss the opportunity of introducing his distinctive method of construction to the world; he, therefore, made his estimates at a figure just sufficient to cover actual cost, leaving to future works his proper remuneration, and in this the near future richly proved his wisdom. The offer of construction was so low that the bridge company accepted it, and 20 days after the destruction of the old bridge, namely, on May 1, work of preparing for the new was commenced. The abutments and piers of the old bridge had been greatly damaged by fire; the injured portions were taken down, and they were thoroughly grouted before the new masonry was laid.

The piers were 50 feet in length at bottom, 36 feet high, 11 feet wide at top, battering 1 inch to the foot. Two bodies of substantial cut stone masonry, measuring 9 feet square and 3 feet high, were erected on each pier at a distance of 18 feet apart. On these the bed-plates were laid down for the support of the cast-iron towers, to which the cables were suspended by means of pendulums, each span being supported by two separate cables, there being in the whole bridge 16 cables. Anchor rods for the towers were properly placed and walled in the masonry; anchor pits were dug within the abutments to a proper depth, a plank box made and placed on the bottom filled with cement grout; then the anchor plates, with the first links, were let down into the cement, a floor of double planking laid on top of the plates and the masonry commenced and carried up, the spaces around the links being grouted with cement as the work progressed. On the curve the knuckles rested on cut stone; thus all the links composing the anchor chains were built solidly in the mass of stone until they reached the surface. Emerging from the masonry they extended a distance of 45 feet to the top of the towers on the abutment, where they were attached to the pendulums and formed the connection with the cables. They were carried up from the anchor plates on such a line as to throw the strain which they were to resist inside the foot of the abutments, insuring the stability of the structure, so far as the ends were concerned.

The towers were composed of four columns connected by four lattice panels secured by screw bolts. The panels up and down stream closed the whole side of the tower, but those in the direction of the bridge formed an open doorway, which served for the continuation of sidewalks from one span to another. On top of the columns a massive casting rested which supported the pendulums to which the cables were attached; the upper pin of the pendulums laid in a seat which was formed by the sides and ribs of a square box occupying the center of the casting. For the purpose of throwing the whole pressure upon the four columns underneath, 12 segments of arches butted against the center box and rested with the other end upon the four corners. The pendulums were composed of four solid bars of 2 feet 6 inches from center to center of pin, 4 x 1 inches with heads of 8 inches diameter, and pin holes 3 inches diameter. To the lower pin the cable of one span was attached directly, and the connection formed with the next cable by means of four links of 3 feet 6 inches long and 4 x 1¼ inches section. I may here quote the language of Washington A. Roebling, the distinguished son of John A. Roebling, "that the peculiar features of this bridge were the pendulums, as by means of these any concentrated load upon one span was distributed over all the others, from anchorage to anchorage. By means of these it became possible to use the small towers which were built upon the narrow piers of the old bridge."

While adopting the pendulums for this bridge, Mr. John A. Roebling did not recommend their general use. In consequence of this pendulum system, several times during the existence of the bridge our river men were enabled to pass under with their boats, whereas without it they would have had to await the fall of the river. In cases where they lacked up to 9 inches of headway in the channel span, they would have all wagons stopped in the two contiguous spans, thereby depressing them and raising the channel span so as to let them through, and this was often of great importance to them.* Before the completion of the piers and abutments an earnest effort was made by Mr. Roebling to be allowed to raise the level of the bridge 10 feet—the expense of which was estimated at $10,000—but without avail. Quite a bitter controversy arose on the subject. The up-river interests called for its raising. Here it was urged that giving a greater headway over the channel might enable boats to ascend direct to Brownsville, making Pittsburgh but a way station between the West and the East. In those days Brownsville was the point where the National Road—one of the main arteries of Western travel—struck the Western waters; from thence handsome packets brought the traveler to Pittsburgh, and this travel formed

* Paper read before the Engineers' Society of Western Pennsylvania, May 15, 1883.

* Since writing the above I am informed that on one occasion Wm. Robinson, by means of heavily loaded coal teams, raised the channel span 14 inches and passed his boat under.

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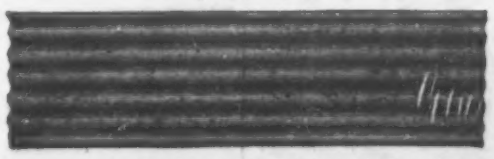

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an important item in our resources, as the passengers generally laid over at least one night in Pittsburgh before taking steamers for their Western homes, this delay furnishing opportunity for our merchants and manufacturers to secure many good customers, and the general feeling was averse to doing anything that might impair this advantage and move the head of navigation to Brownsville. In June, 1845, the Brownsville *Herald* charged the Hon. Wm. Wilkens, then president of the Bridge Co., as successfully opposing the rebuilding of the bridge at an increased hight on the ground that it would let boats pass up to Brownsville, to the injury of Pittsburgh. Mr. Neville B. Craig, then the able editor of the Pittsburgh *Gazette*, in reply said that he doubted the correctness of the report, and denied that the rebuilding of the bridge at the old grade or a higher one would have any effect on the business of Pittsburgh, adding: "This is sheer folly. Pittsburgh, from her size and wealth, her geographical position, her situation at the terminus of the Pennsylvania Canal, and as the converging point of roads and trade and means of intercourse with a wide extent of country, is eminently a point for commencing and closing voyages. In this respect no other place on the Western waters equals her, except St. Louis and New Orleans. How preposterous, then, to suppose that the raising or lowering of a bridge is going to affect her trade. We would be glad to see the bridge raised to give our Brownsville neighbors the fullest opportunity of rivaling Pittsburgh." Again, on the 26th of June, Mr. Craig expressed the wish that the bridge might be raised to the level of Smithfield street. But the reason given for not raising the hight of the bridge, and which we may receive as the correct one, was the low condition of the finances, the existing gloomy state of affairs generally, and the fear of getting into trouble by saddling themselves with an additional debt of $10,000—at that time, all circumstances considered, a fearful amount. The construction of the bridge was therefore continued on the original plan without alteration.

While the work was progressing on the abutments and piers, the wire for the cables was being made. There were at that time but two wire factories existing west of the mountains—Townsend & Co., at New Brighton, Pa., which establishment is still in existence and noted for the excellent quality of its product, and the Pittsburgh Wire Works, Samuel M. Wickersham, which works were swept out of existence by fire in 1850 and never rebuilt. To these two works was given the contract to make the wire for the cables, and about equal quantities were made by each. The greater portion of the iron used in the manufacture of the wire was made and rolled into ¼-inch rods by Lyon, Shorb & Co., of Sligo Iron Works, and it is well to mention here, as showing the advance in 38 years in the manufacture of iron, that the rods then furnished generally weighed but 8½ lbs., though some were rolled of 11 lbs. weight, and when they came from the rolls were so chilled as often to be blue, and always requiring to be annealed before giving them the first breakdown, and then a second annealing and scouring before finishing to No. 10 for the cable. The wire was finished hard and bright. Now it is possible to have rods of steel of 100 lbs. weight, and finished so soft as to admit of being drawn into wire of same number, with the proper hardness, ductility and strength, with but one annealing. The wire for wrapping the cable was drawn to No. 14 and finished by annealing. The anchor and pendulum bars were made by W. H. Everson himself in a small forge, consisting of a not very heavy helve hammer and heating furnace, where he could be daily seen with his leathern apron on, handling the tongs, a prototype of Pat. Lyon, at the very spot on which now stands one of the great iron works of Pittsburgh, and at the head of which Mr. Everson still remains.

The Pennsylvania Iron Works is the 38 years' growth of the modest Pennsylvania Forge. Mr. Everson made the plates out of Juniata blooms; they were required to be of 65,000 pounds tensile strength per square inch; the fact was they were made of what was considered the best iron to be had, and Mr. Everson's knowledge of the quality was the real test the iron was subjected to. All the material used in the structure was closely examined and tested by Mr. Roebling by all the means then at hand—for well he knew that in so light a structure quality became of the greatest importance, and, so far as he could do so, he allowed nothing else to enter into it. Each wire was tested to 1200 pounds tensile strength; it was also held in a vise or in the plyers and bent to a right angle, then bent over to the same angle in the opposite direction, then straightened up; if it stood this without fracture it was received; if not, it was rejected. At this time the ground on the South Side above the bridge site was in open fields; there the workshops were erected and the cables made. Two platforms were built of a hight equal to the required deflection, at a distance apart equal to the length of the cables; an iron pin fixed on each platform on which a cast-iron shoe was placed; a guide wire was stretched from pin to pin, giving the exact length and deflection of the cable. The cables were formed from a continuous wire; the short wires composing it being connected by tapering the ends for about 3 inches with a file, placing the scarfed sides together and wrapping the joint with a fine annealed wire; the wire was then taken from the reel and the bight carried by a wheel from one pin to the other. By means of a hand windlass and a pair of pliers to clutch it, each wire was drawn up to correspond with the guide wire in the center. When thus 750 wires were in their places they were clamped and wrapped by the wrapping machine, worked by hand, from end to end with the No. 14 annealed wire into a compact round cable. When finished, by the aid of a large screw the cable was drawn back, slipped from the pins and laid upon the ground; the wires were each coated with boiled linseed oil, and the cables well well covered with white-lead paint to prevent oxidation. When all the cables were completed, planks were laid upon the ground, and, by means of rollers and fall blocks, they were moved to the river side and placed on flat boats which had been coupled together end to end; the boats were

then dropped to and anchored between the piers.

The towers being well guyed to avoid pulling them over while the cables were being hoisted to their places, blocks were attached to their tops and the cables raised and connected to the pendulums. This part of the work was commenced in the second or third span from the Pittsburgh side, hanging both cables and working both ways until all were in position. Then commenced the laying of the floor beams; these were of white pine, 31 feet long, 4½ x 15 inches; they were placed in pairs at a distance apart of 4 feet. The suspension rods, made of 1½-inch round charcoal iron, were attached to clamps which embraced the cables, and then passed between the floor timbers and through a bearing block and cast-iron washer below. In hanging the beams, care was taken that the spans should not be loaded too heavily at one place, so when seven or eight were hung on one side the span, the same number would be put on the other side, and thus alternately placing them would finish each span in the center. The floor was double, the first laid lengthwise of the bridge, the second across; the roadway was 20 feet in width, separated from the sidewalks by fender rails. The sidewalks were each 5 feet in width, elevated a few inches above the roadway, and were outside the cables. The total width between the railings was 32 feet. The railing was an open lattice of sufficient depth to be self-sustaining, and was one element in giving stiffness to the bridge. A curious circumstance, and worthy of record, occurred at several times to this railing. It was finished with a broad cap-piece running lengthwise of the bridge, covering and concealing the ends of the plank forming the lattice-work. Owing to the vibrations of the bridge this cap-piece would work somewhat loose and take a sliding motion, and several times the friction thus caused set the rail on fire. The movement was of slight extent, but so rapid as to produce this effect. The opposite cables, as well as the pendulums, were inclined toward each other, the distance apart being 27 feet at the top of the towers and 22 feet at the center of the spans. The pendulums on the abutment occupied a vertical position. The floor was further supported by a number of stays, made of 1¼-inch round charcoal iron, extending from the tops of the towers to the beams below for a considerable distance on each side of the piers. Timber supports also extended a short distance from each pier and each abutment; a wooden beam extended across the bridge from top to top of the towers, for the purpose of resisting the side tension of the cables. As stated, the tearing down the portions of the old abutments and piers which had been injured by the fire was commenced on May 1, 1845. The new work was begun in June, and continued without intermission through the summer and fall and following winter, a great portion of the work having to be done in the cold weather of the winter.

The bridge was thrown open to travel in February, 1846, eight months after its building began and nine months after the contract for its erection was signed, but it had been used once before. On the night of December 31st, 1845, the ice in the Monongahela River broke up, owing to a sudden rise. At noon of January 1st, 1846, to relieve the great inconvenience, the first floor having been just laid, the passage of wagons was allowed for one hour, and with great trepidation did the worthy treasurer of the company, Mr. John Thaw, walk to and fro until the whole stream of market wagons and other vehicles, occupying at times the entire length of the bridge, as many as seven teams being on one span at one time, had passed safely over. The whole cost of the bridge was $55,000.

The masonry cost	$13,120
The superstructure cost	41,880
In all	$55,200

It is probable that no other bridge in the world of the same length, having a double carriageway and two sidewalks, has ever been constructed so cheaply.

The bridge is memorable as the first example of the solid wire cable being in great measure depended on to give not only support to the bridge, but also resistance to oscillations. The combination of the wires composing it into one tightly-bound cylinder, while giving a strength of unerring certainty, also gives a stiffness almost equal to that of a solid iron bar, while by hanging the cables with their planes inclining toward each other, a strong resistance is offered to lateral disturbances, and the almost solid inverted arch—which the cables themselves form, with their solid iron rods connecting to the floor—offers the same resistance to vertical movements, thus providing against all the forces with which a bridge must battle. This surely entitles Mr. John A. Roebling, its architect and constructor, to a position in the front ranks of civil engineers. In this bridge many small defects may have been developed in its 37 years' use—some parts may have been made too light; if such have been developed in the taking of it down, it will probably be found that they were such as could have been replaced, as the bridge was so built that any part of it could have been got at and repaired if injured, or renewed if requisite. The bridge was subject to no greater vibrations than are generally observed in the wooden arch and truss bridges of same span. It has often been sorely tried, sometimes when crowded with people viewing a boat race, and sudden rushes would be made from one side of the bridge to the other. This bridge is memorable also as being the first of a series of which the last is the great Brooklyn Bridge.

DIMENSIONS OF THE MONONGAHELA SUSPENSION BRIDGE

Length of bridge between abutments, feet	1,500
Number of spans	8
Length of each span, feet	188
Deflection of cables, feet	14
Number of cables	2
Number of sections of cables	16
Diameter of cables, inches	4½
Number of wires in each cable	750
Weight per foot of each cable, pounds	10
Weight of cables and mapping, pounds	119,000
Length of the 16 cables, feet	3,016
Ultimate strength of the 2 cables	800
Aggregate weight of one span, so far as supported by the cable, with 100 head of cattle on it, tons	110
Tension of cable produced by dead load of bridge and 100 head of cattle on one span, tons	192
Weight of 100 head of cattle at 800 pounds, tons	40
Tension resulting from it when at rest, tons	70
Weight of four 6-horse teams loaded with 104 bushels of coal each, tons	28
Tension resulting from it when at rest, tons	42
Weight of superstructure of one span so far as supported by cables, tons	70
Tension of cables resulting from it, tons	122
Section of anchor chains and connecting links, inches	36
Section of pendulums, inches	32

American Lumber Fields.

The St. Paul (Minn.) *Pioneer Press*, in speaking of the lumber wealth of the country, submits the following interesting and suggestive remarks:

The aggregate results of the logging operations in the Minnesota and Wisconsin woods reveal the stupendous magnitude of the Northwestern lumber interest in a light which will probably astonish persons most familiar with the subject. The total cut of the two States exceeds 4,000,000,000 feet. The mind will be better able to grasp this unwieldy number when it is understood that it represents the trees growing on 1250 square miles, or about 35 townships, of land. In the classification of districts the great Chippewa Valley region of Wisconsin is easily first, with 1,000,000,000 feet on the Chippewa, Eau Claire and their tributaries. The Mississippi above Minneapolis comes next, with nearly 600,000,000 feet. The Wisconsin River returns 441,000,000, the Duluth district 297,000,000, and the Black River 228,000,000. The streams on the west shore of Lake Michigan, grouped together for convenience, show a cut of 785,000,000 feet. On the different railroads in Wisconsin and Minnesota between 500,000,000 and 600,000,000 feet were cut. The cut is by far the greatest in the Northwest.

There is a great truth to which this enormous growth in the logging interest in the Northwest points. The swift and surprising development of the country west of the Mississippi River has created a greater revolution in the lumber business than in any other interest that supplies its varied demands. Within the last few years the enormous demand from the West has revolutionized the lumber trade in its sources, its methods, its channels and its markets. This year's investigation reveals clearly the fact, more vaguely understood before, that the destination of nearly all the lumber cut in Wisconsin and Minnesota is the treeless prairies and magically up-springing new cities of Dakota, Montana, Nebraska, Iowa and even the more southern States. Chicago, once the lumber market for the whole West, gets now only a minute fraction of the enormous product of Wisconsin and Minnesota, and the magnet of the Western demand attracts the lumber from the cheap water routes of the lakes to the westward railroad lines. Nearly all the lumber cut on the shores of Lake Superior goes West by the Northern Pacific. The Wisconsin Central carries a little to Milwaukee, though much of the traffic by that line is diverted by the westward lines it crosses. The great lumber centers of the Chippewa, Black and Wisconsin valleys are drained by the Omaha and Milwaukee and St. Paul to the West and Southwest. Even the lumber on the west shore of Lake Michigan, within easy reach of cheap water transit to Chicago, chooses instead a circuitous route by the Chicago and Northwestern road across Wisconsin, Minnesota and Iowa to the omniverous Western prairies. The once all-absorbing lumber trade of Chicago is reduced to the handling of so much of the Michigan product as is required for Western consumption

The stimulus of the Western demand has changed the methods of lumber production and transit, as well as the direction of its market. The present or prospective exhaustion of the richest and most convenient tracts on the margins of navigable streams, while the demand is annually enlarging, compels a resort to new sources and a more careful gleaning of old. During last winter many tracts were cut for the second or third time. Higher prices and an eager market made it profitable to return to second-class timber, windfalls and smaller growth, neglected in former years. So far as this tendency leads to a cleaner and more economical reaping of the pine harvest, it is to be commended. It may work harm, however, by causing the destruction of half-grown trees, which contain the promise and potency of the future lumber supply. A still more important change in the methods and sources of lumber production is the adoption of means for reaching rich tracts remote from the channels of navigable streams. To an extent not generally understood, the railroads are taking the place of rivers as means of transit of the product, even from its first source. Hundreds of millions of feet of logs are now taken to market every year that never float for a mile on the waters of rivers. Railroads are penetrating the lumber districts in every direction—the North Wisconsin, the Chippewa Valley, the Wisconsin Central, the Northwestern on the Michigan shore—whose sole or main business is the transportation of lumber cut on their lines, hauled to mills at their stations, sawed into boards and loaded into cars, without even seeing a raft or boom. In many cases, narrow-gauge roads are built from the main lines into remote tracts, to enlarge the field from which supplies may be drawn. This change of method adds a large percentage to the available supply, and hastens by so much the rate of exhaustion of the forests.

The question of the prospective exhaustion of the pine timber of the Northwest will suggest itself to every thoughtful person. There is no question but that the time is swiftly approaching when the forests of Minnesota and Wisconsin will no longer answer to the annual demands made upon them, nor that the day is hastened by the extravagant and destructive methods of production, happily less common now than a few years ago. A pine forest is a thing of slow growth, and those of Wisconsin and Minnesota are of definitely limited, though still of vast, extent. They cannot indefinitely endure the stripping of the available timber from 1250 square miles per year. The period of exhaustion of the Northwestern forests has been the subject of speculation. It is vaguely put as ten years, but there are no data to justify such exact computation. The demand is variable, and there are no means of estimating what the supply may become under changed condi-

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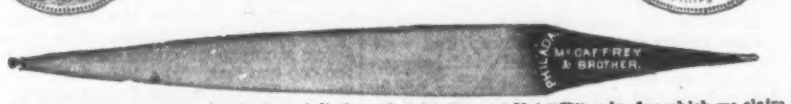
Philadelphia, Pa., U. S.



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J. Haish & Co "S" Barb Steel Fence Wire.

[This Advertisement Changed Weekly.]

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OF EVERY DESCRIPTION.

Largest Variety Made by any House.

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We were the first to furnish the Trade with Couplings and King Bolts finished with Threads and Nuts. They are in general use throughout the country.

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N. B.—Send for Revised Discount Sheet of June 1st, 1883.

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We have made the Inventing and Manufacturing of this class of Machinery

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for eight years, and have the Largest and Best Facilities of any Manufactory in the country.

Will be pleased to give Estimates on receipt of Sample Barb.

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Iron Shingles. Double Cap, Corrugated, Crimped, Bead.

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IMPROVED SHEET IRON ROOFING.

Best quality and simplest plan in use

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Bandsaw Files,
Boot Heel,
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Cross or Crossing,
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Flat Wood,
Gang-Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-Ender),
Handsaw Taper, single-cut,
Handsaw Taper, double-cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
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Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
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Beveled Edge,
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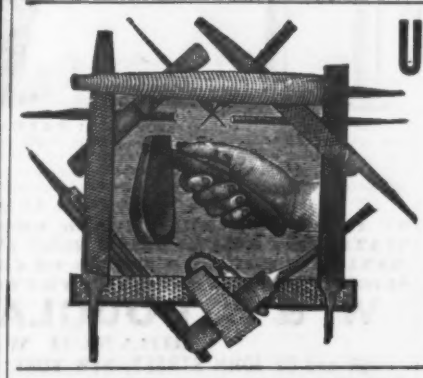
All descriptions of Files made to order. Price List mailed on application. Established 1863.



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Made from the Best Refined Cast Steel.

With all the requisite facilities to produce a first-class article, we are enabled to offer Files that will give entire satisfaction.

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Dinner Pail and Lantern.

The most perfect Dinner Pail in the world. Hot coffee for dinner and a Lantern at night.

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Made of the best American Steel, and warranted to be unequaled in the market. For sale by Iron and Hardware dealers throughout the United States and Canada.

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Manufacturers of the BUTTONS PATENT

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Specially Adapted for Use on Wire Fence.

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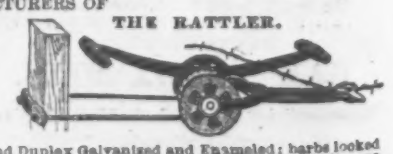

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HOME OFFICE, DE KALB, ILL.

tions. Poorer and less accessible timber will be made available by improved methods, and the pine lands remaining will probably be made to go much further than the same quantity in former years. But the certain fact that the forests are destroyed much more rapidly than they are replaced with new growth makes their exhaustion only a question of time. There are few virgin tracts left now. The loggers are already invading the Red Lake and Vermilion districts in Minnesota, and the railroads have penetrated to the hitherto intact forests above and between the heads of navigable streams in Wisconsin. Whether ten or twenty years hence, the exhaustion of the Northwestern lumber supply is near enough to suggest the most careful husbanding of the resources that remain, and to emphasize the blind and mad folly of a lumber tariff that preserves the forests of our neighbors and puts a premium upon the destruction of our own. These are questions for our lawmakers to ponder over.

SCIENTIFIC AND TECHNICAL.

Liquid Gases and Solid Alcohol.

M. Cailletet, a French chemist, some time ago succeeded, by liquefying ethyline and causing it to boil, in producing a temperature of — 105° C. (— 157° F.), at which he liquefied a few gases under strong pressure, and even caused oxygen to approach the liquid state. M. Wroblewski, of Cracow, one of his pupils, continuing the experiments, has, by boiling liquid ethyline in a vacuum, produced a temperature of — 136° C. (212.8 F.), at which sulphuret of carbon and alcohol were congealed, and oxygen and nitrogen became liquid. The change in the form of oxygen were obtained on the 9th of April in three experiments, in which the conditions of pressure (22½ to 26½ atmospheres) and temperature were slightly, but not essentially, varied. Liquid oxygen is transparent and colorless, differing in this from ozone, which is deep blue. Liquid nitrogen has a similar appearance. Sulphuret of carbon is a white solid at — 116° C., but becomes liquid when raised to — 110° C. At — 130° C. alcohol assumes the form of a white solid, which becomes viscous at — 129°. Carbonic oxide was liquefied under similar conditions with nitrogen.

Scintillations of Stars as Affected by the Aurora Borealis.

According to *Les Comptes Rendus*, M. Ch. Montigny, observing for many years at Brussels, has noticed, as previous observers have done, that the scintillation of stars is much increased during the occurrence of an aurora. He has noticed, further, that every aurora "produces immediately its effects upon the scintillation," that stars in the north are most affected, and that the influence of the phenomenon is most marked for the stars which are observed across the upper regions of the air. Magnetic disturbances also, even when accompanied by no aurora visible at Brussels, increase the scintillation to a marked extent. On two occasions during July, 1881, the effect of magnetic disturbances was observed with no aurora visible in Brussels, or even, so far as can be learned, in any part of Denmark.

The Electro-Motive Force of Batteries.

Recent experiments by Mr. W. H. Preece, communicated to the Royal Society, Great Britain, show that changes of temperature do not practically affect the electro-motive force of a battery, but they do materially affect the internal resistance. Faraday's observation that the improved current from a heated cell is due to increased conductivity is thus confirmed. Mr. Preece's results also show that of the various forms of batteries in practical use the Daniell is most seriously influenced by variations in temperature, and that in all experiments with that battery, either the temperature must be kept constant or frequent measurements should be taken of the internal resistance of the battery and allowance made for the variation.

Scale of Hardness of Common Metals.

A new scale for comparing the hardness of metal has been compiled by Mr. Galliner, who in his experiments used small cylinders with conical points, and passed them loaded up to 5 kg. over polished plates of the respective metals, from which they did not materially differ in hardness. Thus he found, indicating the hardness of pure soft lead by 1, that tin is represented by 2; hard lead by 3; copper, 4 to 5; metal for bearings (85 copper, 10 tin and 5 zinc), 6; tempered cast iron, 7; fibrous wrought iron, 8; gray cast iron, 10 to 11; mild steel, 12 to 13; crucible steel, blue, 14; violet, 15, straw color, 16; hard bearing metal (83 copper, 17 zinc), 17; and very hard steel, 18.

Transmission of Sound.

Herr F. Schell, of Grund, recently described some observations made a short time since, in the course of mining work in the Hartz Mountains, on the distance through which sounds are transmitted in rock. In a horizontal direction the firing of shots at the face of a cross-cut has been heard in a cross-cut driven toward it, the face of which was 447 feet distant from it. A level was driven on a vein at a depth of 538 feet below the surface, and happened to strike 187 feet distant in a horizontal direction below a stamp mill dropping stamps weighing 330 pounds. The dropping of the stamps on the surface could be distinctly heard in the heading below, which, in a direct line, the hypothenuse of a right-angled triangle, was separated by 571 feet of rock.

Completion of the Monitors.—It is understood that Secretary Chandler has decided to have the work on the unfinished monitors Puritan, Terror and Amphitrite continued by the contractors who built the hulls of those vessels under the contracts with Secretary Robeson. Of the $1,000,000 appropriated at the last session for the engines and machinery of the monitors—including the Monadnock on the Pacific Coast, the Secretary has allotted in round figures $410,000 for the Puritan, which is in John Roach's yard at Chester, $208,000 for the Terror, in Cramp's yard at Philadelphia, and $208,000 for the Amphitrite, at Wilmington, Del. It is not yet decided whether or not the work on the Monadnock shall be given to the contractor who built her hull.

The New England Grindstone Business.

"About three-fourths of the grindstones used in this country," says the Boston *Commercial Bulletin*, "are quarried in Ohio, and the balance are quarried in Nova Scotia and New Brunswick, though a few are imported from England. The Ohio grindstone is mainly quarried near Cleveland, though some new quarries have lately been opened in the southern part of the State, near Marietta. The Ohio stone is not of such good quality as the stone from the Provinces, and the latter commands a better price. Ohio quarrymen control the Western market, as the stone from the Provinces cannot compete there, because of the heavy freight rates. In all the seaboard cities and adjacent points the Province stone competes, on account of low water rates, though there is a duty of $1 50 a ton on unfinished and $2 on finished, while under the new tariff the duty will be $1.75 per ton without classification. In New England, the great manufacturing section of the country, the Province stone is preferred, because of the superior quality, and, though it costs from 25 to 33⅓ per cent. more, over two-thirds of the stone used is of this kind. The Province stone is more durable and uniform in quality, will keep true better and is milder—that is, will not burn so quickly. This Province stone is quarried mainly on the Bay of Chaleur, New Brunswick, and on the Bay of Fundy, Nova Scotia, and the stone from each place is about the same quality. Last year about 7700 tons were imported into this country, and a considerable export trade was done to the West Indies and South America. Boston would probably do a great export business in these stones, on account of the shipping facilities, were it not that the bonded charges on these heavy stones are almost as great as the duty. In weight, grindstones vary from a few pounds to about four tons, and in size from a few inches to 7 feet in diameter.

A Pair of Shoes in Twenty Minutes.—In 1880 Charles Stewart Parnell visited Lynn, and while there he was shown about the city by Mayor Sanderson and three or four other gentlemen. The party visited the shoe manufactory of C. S. Sweetser & Co., and the proprietors decided to show Mr. Parnell how quick a pair of boots could be made. It was decided to make a pair of women's grain polish and the work commenced, Mr. Parnell closely watching every movement. He saw the stock for the uppers and the top linings cut out, the eyeleting done and the passing of the uppers from one stitcher to another; he saw the sole leather died out for the bottoms, and the stock fitted. Up to this time the uppers and bottoms had been kept separate. The next he saw was the two parts come together, the uppers lasted to the bottoms, then the uppers were sewed to the soles by a McKay stitcher, and in rapid succession followed the work of beating out, trimming and setting the edges, nailing on the heels, shaving and finishing the same, buffing the bottoms and channeling. Mr. Parnell then took the boots, which had been manufactured in just 20 minutes before his own eyes, and carried them with him to England. These boots, in process of manufacture, passed through no less than 30 hands, and the work was perfect.

Imports of Iron and Steel into Algeria.—Allusion was made in a recent Paris telegram to an agitation in France in favor of raising the import duties upon foreign iron and steel in Algeria, owing to the recent large increase in the receipts into that Colony of these articles from countries other than France. The views of the French ironmasters are set forth in a circular which they have sent to the press. Official statements of the Government are quoted to show that while the value of the imports into Algeria of iron and steel from foreign sources rose from £84,400 in 1880 to £170,840 in 1881, those from France fell from £9060 to £6820. The circular contends, indeed, that the Algerian market is lost to French iron and steel manufacturers, and observes rather pathetically that French railways and French ships are thus deprived of a considerable amount of freight. The comparatively small proportion of this trade falling to France is ascribed to an alteration in the law made in 1867, which removed a differential duty previously prevailing against foreign productions of iron and steel, and reducing them to the same level as the duties on French productions. The circular demands the re-establishment of the former high duties on foreign iron and steel, in order that they may enjoy the monopoly which the former highly differential scale of duties gave them.

Mexico is taking increased quantities of iron and steel. Railroad building has been inaugurated in that country on a large scale, and this develops other industries, in nearly all of which more or less iron and steel are used. The Bureau of Statistics shows that the value of iron and steel shipped from the United States into Mexico has nearly quadrupled in the past two years. The total for 1880 was $1,257,600; for 1881, $2,582,300, and for 1882, $4,239,700. The value last year was nearly as large as the combined total to all ports in Central and South America and West Indies. This total was $4,910,000, of which $1,156,800 was credited to the United States of Colombia and $1,080,000 to Cuba. It is a gratifying fact to know that Mexico is now drawing more iron and steel from the United States than from Great Britain, the total imports of this character from that country in 1881 being $2,653,100. As the new railroad enterprises of Mexico have been largely created by Americans, it is hoped that they will be able to secure most of their supplies for construction and rolling stock in this country. It is evident that a good deal of railroad building is to be done by Americans in Mexico, Central America, South America and Brazil in the next few years. England sent a value of $6,657,809 in iron and steel to Brazil in 1881.

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It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such impositions.

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MANUFACTURER OF
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In All Styles.

J. R. TORREY RAZOR CO.,
MANUFACTURERS OF
RAZORS.

To introduce we offer HOLLOW GROUND RAZORS at $1.50, $1.75, $2; Ivory, $2.50. Our SWEDISH GEM RAZORS, $1.75, $2, $2.50; Ivory, $3. All our own make, and warranted the best cutters in the world. As Razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cents a Strop warranted to set a fine edge to any razor. If in morocco case, $1.

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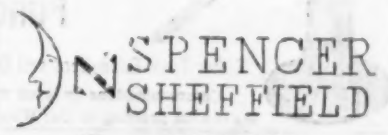

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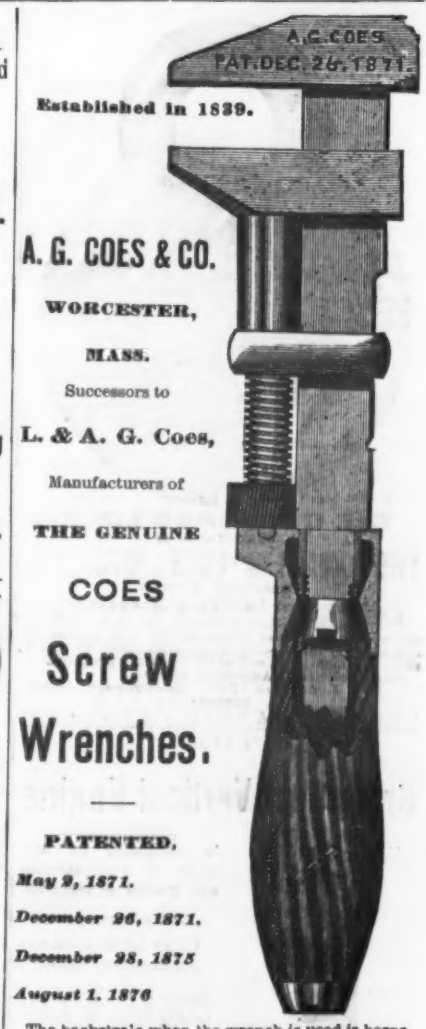

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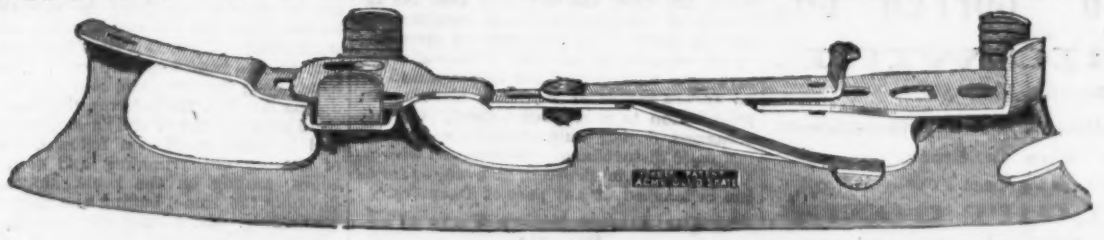

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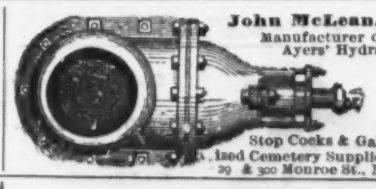

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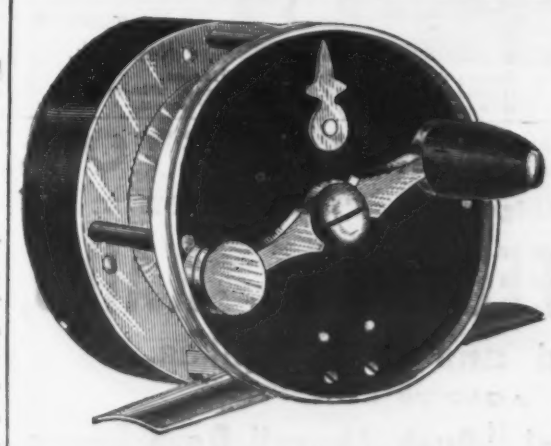

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Prison-Labor Contracts in Pennsylvania.

The Philadelphia *North American* says: "The Hughes bill abolishing the contract-labor system in our prisons and reformatories was passed finally by the Senate before its adjournment. The system as adopted in our prisons was very little abused or liable to abuse, and in many ways was an advantage to the employed and the public purse. There is not at the bottom of this very general movement against convict labor any great principle relating to the humanities, but only a blind resistance to the effort to make convicts and persons consigned to reformatories earn their living. We are aware that the plea is that the system robs honest labor of its just wage; but honest labor is not robbed in this country. Honest labor has the best and least variable reward in this country. This has been the case from the beginning. We are prepared to go to the full extent of an uncompromising resistance to any system which degrades labor or tends to reduce its reward to the low level which prevails in older countries. But at the same time we hold that every prison and reformatory should be made self-supporting. There are no valid reasons why the taxpayer—who, by the way, is an honest laborer in one way or another—should pay a dollar for the support of criminals and indolent persons committed for vagrancy. There is need of a system by which every person incarcerated for crimes and for vagrancy shall be made to earn his living. We do not hold that such persons should be compelled to earn more than a living, and the surplus be turned into the public treasury. But all whose physical condition makes it possible for them to labor should labor—first, for their own good, and, finally, for their own support, in order that the honest portion of the community may not be made to bear the burden entailed at present by vice and crime.

"The contract-labor system as it is pursued in some parts of the country is no doubt a great outrage. It is so in some parts of the South, where convicts are worked in gangs, badly fed and clothed and overworked by cruel taskmasters. Against such cruelty every right-minded person ought to set his face. We are not aware that there is any charge brought against any of the prisons and reformatories of Pennsylvania on the score of inhumanity. We are not aware that our prison authorities require the persons under their charge to labor beyond their strength. Hence we have said that there is no great principle relating to the humanities at the bottom of this enactment. It is simply the fashion to affect a great concern for the comfort of persons who are isolated from society solely because they showed no regard for the comfort of society. It is said that the law will cut off the city from utilizing the labor of the House of Correction inmates beyond the grounds of the institution. As the greater part of the inmates are idle, dissipated and in some sort worthless persons, we see no justice in putting it out of the power of the city to make the institution partially self-supporting. It is no disgrace to work. Work cannot be degraded by the character of the worker. It is with labor as it is with men, for as no man can be degraded save by himself, so labor can never be degraded by anybody. Labor can only be degraded when it is used to degrade society—something not likely to be done, because labor is in itself a measure of salvation to all who engage in it. Every prison ought to be self-supporting, and perhaps that may be done without a contract system. But it should be done, even if it require the repeal of the law."

In the discussion of the Hughes bill in the Senate, June 4th, Senator McNeil presented the following letter from Warden Wright, which, as a view of the subject from the standpoint of an intelligent prison official, will be found interesting:

"SENATOR: A proposed act of Assembly to abolish the contract system in the prisons and reformatories of the State will shortly be brought before the Senate. I submit for your consideration the following reasons why said bill should not be enacted into a law:

"First—It is crude and incomplete in its details, and its only effect will be to make a better market for the prison products of other States at the expense of the taxpayers of the several counties of the Commonwealth, as all deficiencies in earnings are paid by the counties in proportion to their representation in the several penal institutions.

"Second—No substitute for the present system is proposed beyond a direction to employ the prisoners for and on behalf of the State, and, as no money is appropriated to conduct such employment or business, the effect of the law would be enforced idleness.

"Third—Such a result would be additional severity instead of amelioration of discipline, and demoralization in place of reform, as you well know that idleness in prison produces insanity.

"Fourth—It is urgedas an argument in favor of the bill that contract labor is injurious to the free workman. On this subject, in the report of the State Prison of New Jersey for 1877, page 7, will be found as follows: 'The recent agitation relative to labor has developed a strong opposition to prison industries under any form. The grounds of this opposition are that such industries create a ruinous competition with outside labor. Whether such supposed competition furnishes a sufficient reason for maintaining the criminals in idleness, and the cost of that maintenance added to the levy, it is not the province of this report to discuss. If, however, the theory of injurious competition be admitted at all, it will apply with greater power in other directions and against other forces than convict labor. The influx of skilled labor from abroad, and the constantly increasing use of labor-saving machinery, exert an immeasurably greater influence upon the industries of the country than the productions of convicts. The annual increase of the former is probably equal to the whole number of convicts employed, while to the latter is to be added the power of steam, which is the real competitor, to whose productions the industries of penal institutions add an inappreciable item." The fallacy of the grounds upon which opposition to prison labor is based has been shown by the careful and exhaustive examination of the whole subject made by intelligent mechanics and others, and the arguments once plausible have long since been abandoned by nearly all who have taken the pains to investigate the matter. In a population of more than 40,000,000, the number of convicts engaged in mechanical labor does not exceed 20,000, and these divided among all the States. It cannot be, therefore, that prison industries which are so limited can depreciate the value of free labor to an extent that can be estimated.

"Fifth—A change to the public or State account method of employment would undoubtedly prove a costly experiment, if the results in other States are any guide. In the State of Illinois the results of that system for something less than four years caused a debt of $332,832.18, and Governor Palmer, in a message addressed to the Legislature, recommended the adoption of a system 'which combines the retention of complete control of the discipline and government of the convicts with the lease of their labor to persons engaged in special pursuits.' Such an act was passed, and it is stated in the report for Southern Illinois Penitentiary for 1881-82: 'The law is peremtory, not permitting the prison authorities to carry on any manufacturing industries.' A leading cause for the change to the contract system was an appeal from the workmen of Illinois to be relieved from the competition of the State, which was found to be more grievous than that of the private contractors, who secure the highest price attainable for the quality of goods offered for sale. Even at the State Reformatory, at Elmira, N. Y., the public account system, originally one of its main features, has been abandoned, having proven very unsatisfactory. The machinery of the brush factory there was recently offered for sale at a greatly reduced price. The inmates are now employed at shoemaking and molding light castings, all by contract.

"The State of California is now making a very extensive and expensive test of the public-account system, having invested over $300,000 in the jute and chair factories recently started in the State prison at San Quentin. But as these industries will only furnish employment for about one-half the inmates of that prison, other manufactures of articles not now made on the coast by free white labor are to be introduced. The future workings of this great experiment will be watched by all interested in the problem of prison labor. Apparently there is no lack of money and certainly none of care and thoughtful attention to the details of the trust committed to the management. At the recent sessions of the Legislature of Ohio the question of convict labor was committed to a commission of three persons, to examine and report to the next Legislature. Congress at its last session recognized the fact that this labor problem was a matter of national concern, and appointed a commission to sit during the summer and report to the next Congress. As these reports will doubtless cover many important matters, there is no need for haste at this time; possibly some solution of a national character may be arrived at. There is no urgent call for relief at this end of the State. Our industries in this prison are so diversified that no one's interest is sacrificed. We have shops for making shoes, chairs, brooms, cigars, tinware, and a small shop for ironwork. The earnings at this time amount to over $5000 per month, and the overwork earned and received by the prisoners amounts to $1000 per month. In other words, the taxpayers of this penitentiary district will be called to pay just that much beyond the usual deficit if we have to return to the old system. For many years we carried on labor in the cells on State account, making shoes and weaving checks, but at length scarcely realized the value of the raw material, such was the competition of steam-power machinery. It was alike unprofitable in a moral point of view. Now the labor is alike cheerful and valuable, health-giving and promotive of the growth of purer thoughts and brighter hopes. I shall deprecate and bitterly regret any action which shall compel us to shut up our prisoners in idleness, for, as I said in the beginning of this paper, the passage of this act means the deplorable result of no funds to be provided for manufacturing purposes.

"Your experience as a member of the Workhouse Board will clearly show you that a capital of not less than $1000 per man will be needed to carry on any extended system of manufacturing. I do not think you are prepared to give such an amount at this time. I do not think that any one desires to compel us to keep the prisoners in idleness, and I hope the hazard of such a result may be avoided. I presume you are aware that the 'strike' of last summer caused a stoppage in our iron-working shops of nearly three months, and very nearly caused an abandonment of prison labor. A certainty of prison contracts ending at the end of the present term, added to dullness of trade from any cause, would certainly result in a loss of contracts, without awaiting the full term, and possibly proving a greater loss. To guard against such a contingency I submit this question to you in its various lights, hoping for such action as shall best promote the interests committed to your care.

"Very respectfully,
"EDWARD S. WRIGHT."

The bill passed finally, with but three dissenting votes—Messrs. McNeill, McKnight and Laird.

In the House Mr. Hughes offered an amendment to the bill to abolish the contract system in prisons and reformatories, providing that the wages a prisoner may make while in prison be appropriated to costs of suits and fines of courts, any surplus remaining to be paid to the family of the prisoner. The amendment was agreed to and the bill laid over for final passage.

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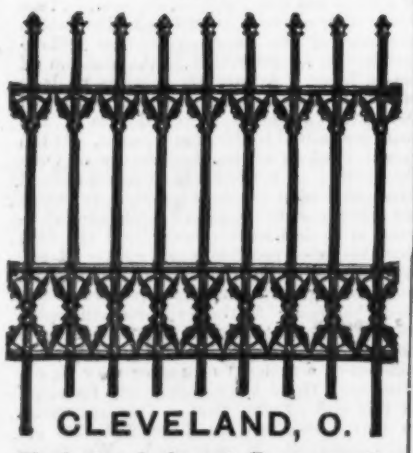

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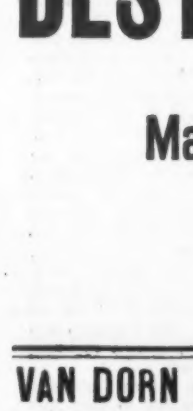

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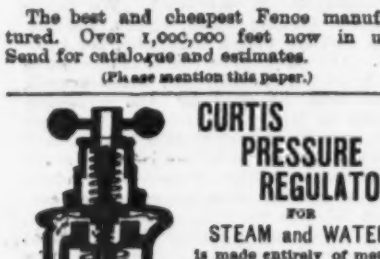

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METALLURGICAL NOTES.

Determination of Phosphorus in Iron and Steel.

In describing Mr. E. Agthe's process for the determination of phosphorus in iron and steel, as given in a German chemical journal, the *Chemical News* states that from 0.5 to 1 gram of the specimen, according to the quantity of phosphorus supposed to be present, is dissolved in 50 c. c. nitric acid; the solution is evaporated to dryness, the residue strongly heated, and afterward—in order to expel the last trace of nitric acid—it is evaporated down again with hydrochloric acid. It is then redissolved in hydrochloric acid; so much hot water is added that the silica may separate out; the solution is filtered into a porcelain capsule, and evaporated on the sand-bath at a high temperature as long as everything dissolves on shaking the capsule. It is then further evaporated, as far as possible, at a lower temperature; but no firm, solid crusts must be formed. This evaporation must be conducted with especial care; if a little too much hydrochloric acid remains unevaporated the result will be too low, but if hard crusts are formed a clear solution cannot be obtained with nitric acid. When cold, 35 c. c. ammonia of sp. gr. 0.96 are added and stirred up with a glass rod, so that a thick paste is formed; 77 c. c. nitric acid of 1.2 sp. gr. are then added; the capsule is set in a warm place, and stirred to promote solution. The solution is rinsed into a beaker, and when no longer too hot, from 50 to 100 c. c. molybdic acid added, well stirred; the beaker set in a warm place (not above 80°) for four hours, let cool, filtered and washed with dilute molybdic solution. The washed precipitate is dissolved upon the filter in a minimum of ammonia, and the ammoniacal solution is mixed with hydrochloric acid till the precipitate formed redissolves with difficulty. When the beaker is quite cold, 15 to 25 c. c. magnesia mixture are added; the whole is well stirred, filtered after standing for six hours, slightly washed with ammoniacal water, dried, ignited and weighed. The filtrate from the ammonium, phosphomolybdate, is mixed with ammonia, and set for four hours in a warm place, observing if a further yellow precipitate is formed. If this is the case the analysis is defective; the liquid is then neutralized, as far as possible, with ammonia, more molybdic solution is added, and the second precipitate is weighed along with the former. Mr. Agthe prepares his molybdic solution by dissolving 115 grams molybdic acid in 460 ammonia at 0.96 sp. gr., adding 1 liter water, and pouring this solution into nitric acid of sp. gr. 1.2. The liquid is let stand for a day and filtered. For magnesia mixture he takes magnesium chloride, 101.5 grams; ammonium chloride, 200; liquid ammonia, 400 grams (sp. gr. 0.96), and water, 1 liter.

Improvement in the Construction of Blast Furnaces.

Mr. William Kent, of Pittsburgh, Pa., has recently been granted a patent for an improvement in the construction of blast furnaces, the object of which is to dispense with the double wall of ordinary blast furnaces, and the expansion space between the two walls, and to substitute for it a single wall, surrounded by a skeleton of upright bars and bands. This frame is so constructed that it is not liable to be destroyed by the expansion of the wall which it incloses. The advantage claimed for this single wall is that the air having free access to the outside prevents it from being so rapidly burned out as the inner wall of the ordinary blast furnace, the outside wall, in this case, retaining a considerable proportion of heat. Adopting Mr. Kent's improvement, it will also be seen that the furnace wall is constantly visible and accessible for repairs, which can be made from the outside while the furnace is in operation. Furnaces having inner walls, invisible and inaccessible from the outside, must necessarily be repaired from the inside, after blowing out the furnace, involving expense and loss of time. The frame surrounding the furnace wall, as proposed by Mr. Kent, consists of vertical bars of railroad iron and horizontal iron or steel bands. Each band is provided with a spring joint, making it elastic and free to expand and contract with variations in the temperature of the fire-brick wall. The spring used is the ordinary car-buffer spring of edge-rolled steel, having a range of motion of 1½ inches, and capable of sustaining a load of 10,000 pounds before closing. The springs may also be used as an index of the amount of strain on the bands. Suitable provisions have also been made to prevent the bands from slipping down when they are loose. When the furnace is put in blast there should be a space of, say, 2 inches left between the ends of the horizontal bands, with only a moderate strain on the springs. A bolt which connects the two ends of each band should be long enough to allow an expansion of 5 or 6 inches. As the furnace becomes hot the wall will expand, bringing a strain on the spring. Before the latter is entirely closed the nut operating the bolt should be unscrewed to relieve the strain, and the spring should be closely watched for a few days, until the furnace has reached its regular working heat. The nut should then be adjusted, so that the spring will be strained to one-half its capacity, after which it will not require further attention while the the furnace is in blast. The slight expansion and contraction which may be caused by variations in the heat of the furnace while in blast will be amply compensated by the elasticity of the spring. The arrangement described may naturally be applied to any portion of a blast-furnace stack, as well as to the whole. One of the furnaces of Shoenberger, Blair & Co., at Pittsburgh, was partially rebuilt in this manner about three years ago, the single wall with elastic bands being used for a space about 20 feet immediately above the mantel plate, with entirely satisfactory results. The springs, being kept cool by the circulation of air outside of the walls, and never strained beyond half of the load necessary to close them, are said to be even now apparently as elastic as when they were new.

Magnetic Iron Sand Deposits.

Deposits of magnetic iron sand exist in many places on the shores of the St. Lawrence River. On the upper portion, some of the comparatively most extensive ones are at Batiscan, and on the adjoining banks of the river near this place. These deposits on the upper portion of the river, however, are much mixed with sand, and, with the exception of small isolated patches, do not average more than 20 per cent. of magnetic iron grains, or about 15 per cent. of metallic iron. Lower down the river the deposits become of a richer character and of much greater extent. There are large deposits of iron sand at Bersemis, but which are, unfortunately, difficult of access, owing to the exposed and abrupt conformation of the coast: at Moisic, however, where there is again a very extensive deposit, the beach gradually slopes to the water, the Moisic River here also forming a good harbor, making it easy of access. The deposit of iron sand at this locality is of exceptional richness, and therefore, perhaps, worthy of fuller description. Owing to the peculiar action of the waves and currents, caused by the configuration of the coast, which apparently act somewhat in the manner of a gigantic gold-washing bowl, the magnetic iron is thrown together in broad belts of great purity, of from 1¼ inches to 2 or 3 feet in thickness, and separated from each other by layers of sand. This belt is of an average width of 50 feet, and extends along the beach for a length of 3 miles, with numerous underlying layers of rich magnetic iron sand, the thickness or extent of which, beyond a depth of 12 feet, has never been fairly investigated. The percentage of iron of this magnetic iron-sand belt, as given by Dr. T. Sterry Hunt, in the Government Geological Survey of Canada, is as follows: Iron, 55.23 (equal to magnetic iron 76.6), and with sulphur, .07; phosphorus, .007; titanic acid, 16; silica, 5.93; lime, .9; manganese, .8. Part of the iron exists in conjunction with the titanic acid, in the form of titaniferous iron, but an average sample, carefully separated several times by the magnet, gave over 50 per cent. of almost pure magnetic iron, containing only traces of titanic acid and manganese, and free from phosphorus and sulphur. About 15 years ago this remarkable deposit of magnetic sand at Moisic attracted the attention of some capitalists at Montreal, and open-hearth furnaces, coke ovens, and the necessary buildings in conjunction with them, were constructed for the manufacture of charcoal iron. The quality of iron produced was all that could be desired, but the works were not a commercial success. This was owing to the refractory nature of the titaniferous iron, coupled with the fine state of division of the magnetic iron sand, causing a very large quantity of fuel to be consumed for the production of the iron. Attempts were made to separate the impurities by shading and washing tables, which were unsuccessful, owing to the closeness of the specific gravity of magnetic iron and titaniferous iron, they being as 5.18 to 4.70. The works had consequently to be abandoned, though they are still standing on the spot, together with some 10,000 tons of magnetic iron sand collected in heaps near the furnaces. There are again deposits of magnetic iron sand lower down the coast of the St. Lawrence, and extending up toward Labrador, on the north side, at Mingan, Natasquan and Kegasha, which are said to be quite extensive.

Condition of the Crops.

The official report on the area and condition of the winter and spring wheat crop gives it lower than in May throughout the entire area, with few exceptions. The decline amounts to 4 points in Connecticut, 14 in New York, 2 in Ohio, 8 in Indiana, 15 in Illinois and 7 in Missouri. It is slight in Michigan and generally throughout the South. The general average of condition is 75, against 83 in May. In June, 1882, it was 99 for winter wheat. It is by States as follows: Connecticut, 92; New York, 63; New Jersey, 101; Pennsylvania, 97; Delaware, 83; Maryland, 98; Virginia, 93; North Carolina, 95; South Carolina, 95; Georgia, 96; Alabama, 95; Mississippi, 83; Texas, 86; Arkansas, 80; Tennessee, 85; West Virginia, 88; Kentucky, 77; Ohio, 60; Michigan, 80; Indiana, 67; Missouri, 70; Illinois, 51; Kansas, 89; California, 88, and Oregon, 90. These figures indicate the condition of the growing wheat, without reference to loss of area by plowing up winter killed areas. The spring-wheat area has been increased about 500,000 acres, or nearly 5 per cent. Wisconsin reports a reduction of 1 per cent. and Iowa of 2 per cent. Minnesota makes an increase of 5 per cent., Nebraska of 7, Dakota of 40 and Montana of 35. The spring-wheat States have an acreage of nearly 10,000,000 acres. The condition of spring wheat is everywhere high, averaging 98 per cent., the same as last year. The area of barley is increased 5 per cent. Total acreage, about 2,350,000 acres; condition is high, averaging 97 per cent. There is an increase of 3 per cent. in the acreage of cotton, a somewhat backward condition of the crop, but a fair stand, medium vitality and unusually clean culture. Considering the time yet available, this is a reasonably encouraging condition of things. The greatest percentage of increased acreage is in Texas, which State also leads in area, having 3,035,000 acres out of the total of 16,780,000 acres.

The naval authorities at Annapolis are engaged in testing a 6-inch rifled cannon made by the South Boston Iron Works, from which remarkable results have been obtained. With 25 pounds of powder a velocity of 1920 feet was given, and with 32 pounds 2120 feet muzzle velocity. The maximum pressure with 32 pounds of powder was 14 tons per square inch. The best results obtained from the 6-inch Krupp, Armstrong and Woolwich guns is 2100 feet muzzle velocity, with 37 pounds of powder and 70-pound shot.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, June 21, 1883.

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The Percentage of Idle Blast Furnaces.

It is often a subject of comment, when the number of blast furnaces in the United States is under consideration, that there should always be so many of them idle. Even in seasons of prosperity and of high prices for pig iron, not more than two-thirds of our furnaces are ever in blast at the same time. In recent years (1872–73 and 1880–81) we have witnessed the greatest activity among manufacturers of pig iron, but at no time did the percentage in blast of the whole number of furnaces exceed 64. Of course, in times of drooping prices, diminishing demand and fierce competition for business, the number of furnaces out of blast will necessarily be large. But it is surprising that in the best times one-third of them should be turning out no pig iron, while foreign countries are being drawn upon to supply a deficiency. Now that the "boom" has spent its force completely, and we are back to low prices and diminished production, it will be interesting to note how activity among the furnaces has varied during that busy season and the dull years which preceded it, going back to the "flush" times of 1872–73.

At the close of 1872 there were 571 blast furnaces in the country, of which only 370 were in blast at that time, or 64 per cent. From that year the number of furnaces increased, while the number in operation decreased, until at the close of 1876 there were 714 furnaces in the country, but only 236 of them were in blast, or but 33 per cent. of the whole number. The turning point then came, and at the close of 1880 there were 446 furnaces in blast out of 701, or 64 per cent. The same percentage was in blast at the close of 1881, but at the close of 1882 it had fallen to 61 per cent.; on the 1st of last April it was only 55 per cent., and on the 1st inst. it was only 51 per cent. The facts are well shown in the following table:

Close of	Completed furnaces.	Furnaces in blast.	Percentage in blast.
1872	571	370	64
1873	657	410	62
1874	693	363	52
1875	713	293	41
1876	714	236	33
1877	716	220	30
1878	692	265	38
1879	697	388	56
1880	701	446	64
1881	716	455	64
1882	687	417	61
April 1, 1883.	687	375	55
June 1, 1883.	685	351	51

The variation in the number of completed furnaces is, of course, due to the abandonment or destruction of old furnaces and the erection of new ones. This number changes constantly. There are various explanations of the idleness of so many furnaces in prosperous times. There are many charcoal furnaces which are so situated that several months of preparation are required, especially in securing fuel supplies, before they can start. Often these fuel supplies can only be obtained in the winter, when snow enables wood to be hauled easily and cheaply. Charcoal furnaces are therefore found to be late in starting up when flush times come, and late in stopping when dull times make their unwelcome appearance, simply because in the former case they have no stock to start with, and in the latter case because they have stock which must be worked up. Sometimes it happens that furnaces cannot start up after a long season of idleness because the demand for ore is, for the time, greater than the supply. This was seen in 1879, when quite a number of furnaces whose owners were impatient to light up were obliged to be kept inactive for a considerable time until the supply of iron ore increased sufficiently to enable them to lay in stock. It happens also that furnaces are occasionally in the hands of persons who are too weak financially to operate them. We are cognizant of several such furnaces which were not operated at all during the boom, although they are favorably located. No matter how high prices may be, there will be break downs, accidents, and necessary and enforced stoppages for repairs, which may require months of precious time. It would, indeed, be a marvelous combination of circumstances that would enable even 90 per cent. of our furnaces to be in blast at one time. It would be an absolute impossibility to have them all in blast at once. Not even in a single district of any consequence as an iron-making center is such a condition of affairs ever seen. It would be a wonder of wonders, for instance, to have every furnace in the Lehigh Valley in blast at one time, or in the Shenango Valley, or in the Lake Superior district, or in the Hanging Rock region. If 66 per cent. is exceeded in any of these localities, it is doing remarkably well, as we have shown.

We are inclined to think that no greater proof is needed that a work is too big for its engineer than the excuse which is frequently made after completion that the thing was experimental, and hence it was not to be wondered at that mistakes were made. At the coroners' inquest upon the bridge disaster, one of the leading trustees made remarks to the effect that, if in the beginning they had known as much as is known now, the bridge would in many ways have a greater capacity. The excuse given is, of course, that the thing was to a certain extent experimental, and there were some things that could not have been foreseen. We see no reason why the crowds which cross the bridge could not have been foreseen by counting the passengers on a Fulton ferry-boat, or, what is better yet, the number of people who during the one-cent hours pass down Beekman and Fulton streets at a point as high up as Nassau. The number of this crowd could be easily checked by ascertaining the number of persons who walk away from the Fulton ferry-house in Brooklyn. The figures thus obtained would certainly have prevented some of the mistakes which have been made. That they were not obtained is creditable neither to the bridge trustees nor to the engineers.

Some Things Which Mr. Bright Does Not See.

In a speech delivered in Birmingham, June 13th, the venerable John Bright made a mistake, very common with Englishmen, of looking at American affairs through British spectacles. Mr. Bright reviewed the events of the last 50 years, and laid stress upon the enormous advantages conferred upon the country by the repeal of the Corn Laws. Referring to America, Mr. Bright said: "Permit me to address a word to the artisan "classes of the United States. I am no "enemy of the United States. I fought her "battle in this country. I sympathize with "her as much now as I did then—almost as "much as if born upon her soil. I believe "the question in the United States between "a protective and simply a revenue tariff is "weaving its solution. The opinion is grow-"ing that irresistible economic facts are "offering themselves for the consideration "of statesmen and every intelligent man in "the great Republic. An extraordinary con-"dition of things exist there. No country "of any age ever experienced or dreamed of "an actual surplus of thirty millions sterling. "This fact is fatal to the high protection "party. The Government does not well "know what to do with it." After eloquent allusion to the war which abolished slavery, Mr. Bright said: "I believe the next elec-"tion for President will be fought on free-"trade lines. The great people of the "United States will declare it to be the "inalienable right of every American citizen "to spend his money in the world's cheapest "market."

Mr. Bright is so highly respected in this country that no American citizen would think of regarding anything he would be likely to say of us as an impertinence. It must be admitted, however, that in this instance he speaks with a confidence not warranted by the probabilities. So far as we are able to judge, the question of the tariff is likely to have much less prominence as a political issue in the next Presidential campaign than it had in the last one.

The greatest danger which the friends of protection have to fear is that the issue will not be clearly drawn, and that the real intention of the Democratic leaders will be so skilfully concealed in the glittering generalities of their platform that the people will not know, until they learn from experience, what the purpose of the party is. The Democratic party is so divided on this question that the object of ambiguity in its declaration of principles will be quite as much to confuse its friends as its enemies. If the friends of protection to American industry can succeed in drawing the line sharply, and in making every voter understand that his ballot must be cast for protection or against it, the battle will be won before election day.

It is not surprising that Mr. Bright stands amazed at the spectacle of a nation burdened with a surplus revenue and an overflowing treasury; but we should think his training in statesmanship, if not in simple arithmetic, would show him that the way to reduce this surplus is not to reconstruct the tariff on the revenue basis. The position of the United States is unique in many respects. Ours is probably the only important country in the world which can show a substantial progress. England is not progressing, France is not, Germany is not; we find no substantial progress anywhere on the Continent of Europe, and but little worth mentioning in the countries north or south of us. So far from being "fatal to a high protection policy," the position of the United States triumphantly vindicates its eminent wisdom. Our surplus simply shows that we have made the mistake of continuing internal taxes long after they had ceased to be necessary, and that too many of our rates of duty are now more productive of revenue than useful for the protection of native industry—those on tin plates and steel blooms, for example.

We fail to see how the arguments advanced in support of the abandonment of protection can be assumed to have any weight as against the facts and statistics, which are so plain that he who runs may read. What difference does it make that our export market is limited, and that our manufactures cannot compete in prices with those of Great Britain, Germany and France in the consuming markets of the world? This is a matter which may be left for the future to settle. It has small present interest. In times of average prosperity we have no surplus to export. In 1880 the value of our exports of manufactures was only 2 per cent. of our total production; the other 98 per cent. were exchanged and consumed at home, but there was no glut or oversupply. When we come to consider the interests of the agricultural classes, we find that they are not excluded from the export trade by protection, and, if they were, the interests of the farmer are secondary to those of the manufacturer. The productiveness of capital employed in manufacturing, as compared with that invested in farms and implements, is as 2 to 1, and it is this difference which makes the farmer a profitable home market. Even New York derives more from manufacturing than from foreign trade. At this port not less than 77 per cent. of the foreign commerce of the country is received and shipped, but the $650,000,000 worth of manufactures annually produced in New York and Brooklyn support more people and contribute more to the wealth of the city than its foreign trade, a very large part of which pays only warehousing and transshipment charges. The interests of the masses of the people are identified with those of domestic industry as they never were, and never can be, with foreign trade. Their interests as producers are greater than their interests as consumers by the amount which their earnings exceed their expenditures for food, clothing and shelter. We have no doubt the position of affairs in this country looks to Mr. Bright exactly as he describes it; but he only sees what an Englishman would be apt to look for—a possible market for English manufactures and a still cheaper source of food supply for Great Britain.

The Position of Lead.

Since the beginning of the current year the position of lead in this country has been different from that of any other metal. With other metals, causes tending to advance or depress prices on one side of the ocean are promptly responded to by the markets on the other side. Not so with lead. In Europe the price of this metal has declined to a figure lower than we remember in 30 years. We are assured that it is even below net cost of production, and that in England, Spain and Germany production will have to be restricted to avoid oversupply and enormous decline in value. But, notwithstanding these predictions, we see that the Mechernich Mine, in Germany, the greatest in the world, has paid a good dividend to shareholders. The production of this mine in 1882 was 25,054 tons of 2240 pounds, and 5108 kilograms of silver, yielding a gross profit of 2,256,727 marks, and leaving, after setting aside toward the sinking fund, &c., a sum of 879,560 marks, a net profit of 1,377,167 marks, out of which a dividend of 13 per cent. on a share capital of 9,600,000 marks was declared. With the exception of three companies, every one of the fourteen mines in Germany produced more lead in 1882 than in 1881, as the following comparison will show:

	1882. Tons.	1881. Tons.
Stolberg Co.	14,919	13,996
Rhenish Nassau Co.	6,239	7,200
Mechernich Co.	25,055	23,409
Commern Co.	2,727	2,362
A. Poensgen & Sons.	3,100	3,189
Rothenbach Works	42	55
Walter Cronek Works.	5,858	5,489
Friedrichs' Works	8,683	8,450
Mansfeld Works.	none	none
Upper Harts.	10,447	9,428
Lower Hartz	570	424
Ems	5,803	5,772
Braubach	3,176	2,721
Freiberg	5,064	4,494
Total	91,690	85,989

Spain's steady increase, the low price notwithstanding, we have shown in former articles, but we are now able to give particulars of the first quarter's export from that country:

EXPORT OF PIG LEAD FROM SPAIN IN JANUARY, FEBRUARY AND MARCH.

	Tons.	Pesetas.*
1881	25,370	11,837,904
1882	28,527	14,083,832
1883	27,534	13,013,856

*1 Peseta = 20 cents of our money.

We showed last year, from Spanish mining companies' reports, that the average dividends declared were quite remunerative. On June 1 English lead sold in England at £12. 17/6 to £13 per ton, and Spanish at £12. 12. 6 per ton. Reduced to American money, the pound of Spanish lead in the London market does not bring over $2.70 per 100 pounds, 5 cents lower than we have seen domestic lead in this market, yet Spain ships this year more than ever. China takes from Europe steadily 1000 tons of lead per month, and the trade on both sides of the ocean have watched with some uneasiness the various phases through which the relations between France and the Chinese Empire are now passing. A commencement of hostilities would, of course, put a stop to lead exportation to China at once, which would leave that much more on the hands of Europeans. It may not be enough to still further depress a price already so low, but it may hinder a recovery. The outlook in the European lead market as it stands certainly is far from cheerful, and a Franco-Chinese war would aggravate it.

In view of these facts, the steadiness of the lead market in this country and the level at which the price has been maintained are well calculated to create surprise. Everybody interested knows that lead is intrinsically as weak as it can be; but there is so much eagerness displayed by consumers to secure the amount they will want during the summer and fall, by buying to arrive, July, August and September deliveries, that holders and producers of lead, both on this coast and in the West, maintain pretty stiff prices, with a fair development of activity in the two great distributing centers, St. Louis and Chicago. Meanwhile the metal trade, feeling from all appearances tolerably safe that for a month or two lead is not likely to experience a sudden drop, seem to trouble themselves as little about the more distant future of lead values as they did about copper when, toward the close of February, it was quoted at 18 cents in the New York market.

As for the white-lead market, so important at this time of the year, a fair consumptive demand prevails for lead in oil, and, although small lots only are wanted, the business in the aggregate amounts to fair proportions. The product of corroders shows but slight accumulation, and 6 cents, net, remains the bottom figure, while in some instances, according to size of order, as high as 6¼ cents is demanded. Dry is neglected, and quoted, nominally, 5¾ cents. Western is offering freely at 5⅝ cents and less, without attracting buyers. In other branches of the lead trade a steady, moderate demand for manufactures is noticeable. In a word, the entire situation is devoid of exciting features, and, as we have said, is likely to remain so until September.

The Evil of Speculation.

Another startling event disturbs the business world, but this time it is a collapse in speculation, with which legitimate business men have little sympathy. For months past powerful rival cliques in Chicago have been buying and selling lard—or, rather, dealing in futures, each taking their chances of a rise or fall. To aid them, banks in New York and Montreal have been called upon for large sums of money. On Saturday it so happened that Peter McGeoch, the "Lord of Lard," was unable to keep his engagements. As he himself charges, an old, trusted friend "went back" on him. He had evidently become so heavily loaded that he was abandoned in an extremity and left to flounder alone. Immediately prices fell $2 to $2.50 per 100 pounds, carrying consternation into the ranks of the trade, and the losses figure up somewhere between $3,000,000 and $4,000,000, but, so far as known, not seriously involving parties in Chicago or elsewhere who were not directly concerned. Of course, the profits of others, on the "bear" side, may have correspondingly increased. Whether or no, Wall street looks on complacently. With lower prices, it is but reasonable to expect a renewed export demand and increased railroad earnings. For the same reason, other food products are liable to fall in sympathy. Already we notice the effects on the New York Produce Exchange, as well as in Western cities. The provision market all through is, to some extent, temporarily demoralized. To the industrial classes the failure at Chicago is good news. Speculation in food products, by artificially bolstering prices in the absence of a legitimate demand, is a crime that cannot be too seriously denounced, and society through all ranks has no tears to shed when punishment overtakes the guilty. It now becomes an interesting question, Where is this sort of thing to stop? Were it not for the fact that foreign markets incline to drop correspondingly with our own, we might easily imagine that the day is breaking.

The curse of trade to-day is organized, systematic speculation. There is nothing in the present methods of manipulating commodities on 'change which bears the least resemblance to the legitimate ventures which old-time merchants were wont to make, based upon sound business principles and involving the risk of some part of their capital in undertakings depending for their success upon the correctness of their judgment and the accuracy of their forecast of the future. It is true all commerce is to some extent speculative; but speculation of this kind is a very different matter from that which is now planned and carried out in all departments of trade. The kind which most of our exchanges seek to foster and encourage is gambling pure and simple. It should be discountenanced by all who have substantial interests at stake, or who believe in maintaining old-time standards of business and public morals. All well-managed banks should refuse accommodations to gamblers, whether the game they play be "faro" or "margins," and, so far from countenancing rules for the regulation of speculation, men in legitimate business should refuse it countenance or recognition, and force the gamblers to depend for protection upon each other's honesty. We are well aware that these are old-fashioned views of business, and that the lively young men of the various mercantile exchanges will smile as they read, but, all the same, we speak the words of truth and soberness. The benefit which a trade will derive from speculation is about equivalent to that which an individual may expect from alcoholic stimulants. The more it is sought to surround gambling with safeguards and regulations, the more strongly will it become intrenched as an evil, and the wider the range of its mischievous influence. Granted that it exists, and that it cannot be suppressed; we can at least leave it where it belongs—outside of legitimate trade and unrecognized as a part of our business system. There are many evils which cannot be suppressed and the existence of which must be admitted, but there is no reason why we should recognize and foster them or surround them with the safeguards of legal protection.

William Mason, one of the founders of the locomotive industry in the United States, died at Taunton, Mass., on the 21st of May, at the age of 76. Mr. Mason's mechanical ability and mechanical good sense made him a marked man even among the exceptionally ingenious and mechanically inclined Yankees. The work which he did in modifying the early American locomotive and producing the present standard type was very great—how great very few people, even in railway circles

know. The general public knew Mr. Mason only as a locomotive builder, but he in his time devoted a great deal of attention to cotton-spinning and other machinery. Many of our readers will remember that Mr. Mason was the first man who built a Farlie engine in this country, and the only one, if we remember rightly, who ever constructed a double-truck engine of this pattern. On these engines he adopted the Walschaert valve motion, from which it will be seen that he was not at all among the blind worshipers of the link. In regard to the great double-ender, the "Janus," built some eight or ten years ago, which had double boilers and two sets of cylinders, he said not long since that he should probably never make another like it, as it was impossible to make a practical engine on that plan, which, if a sufficient amount of water was carried, would weigh 180,000 pounds.

Every legitimate business interest outside of the railroad pooling combination called for free canals. It was all important that the State canals should be maintained, if only as a check to railroad greed. So the people believed when they carried through the constitutional amendment at the polls last autumn. We have now had several weeks of experience with free canals—enough to show that 50,000 tons of iron ore are under contract for removal from Port Henry to South Amboy, which the miners last year could not afford to ship. Grain transportation, however, is the principal item, for which the boatman gets this year 4½ to 5 cents per bushel, against 4½ cents last year, when 1 cent toll had to be paid. Those who are familiar with canal navigation know that the difference indicates almost exactly the margin of profit, and therefore is an important factor. The action of the Legislature, therefore, sanctioned by the popular vote, was well taken. But it is not yet fully apparent that the renewed prosperity of the canals is due to exemption from tolls. The Erie Canal was officially opened this year May 7, or almost a month later than in 1882. Notwithstanding the disadvantage here noticed, the increase of business this year up to date is very decided and beyond expectations—something like 30 per cent. How much influence the removal of tolls has had on the movement of freight cannot as yet be determined, as the amount of grain received at Buffalo last month surpassed that of any corresponding month of former years, with a single exception, and consequently the railroads, as well as the canals, are more heavily pressed. With six railroads and a canal between Buffalo and New York, there will probably be little difficulty on this score hereafter.

Some mechanical engineers who have recently been investigating the operations of the electric-light companies with a view to the introduction of electric-light plants, have made most unfavorable criticisms upon the mechanical construction of some of the electric-light machinery at present turned out. Their complaint is that it is rough, carelessly made and poorly fitted, and that before a high efficiency can be attained by certain companies their metheds of construction must be entirely remodeled, and the work done on the dynamos be as fine and as accurate, to say the least, as that to be found on engines which are to run at a similar rate of speed. Whether this criticism is just or not we cannot say from personal inspection of the machines in question, but we are inclined to think it has a fair foundation. On the other hand, we have heard high praise awarded to certain manufacturers for the care which they take in the construction of all parts of their dynamos.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. Carl Hering read a short article on electrical units and formulæ, giving a list of the units and the relations existing between them; showing how these relations can be combined into formulæ containing any two or more of the units, for convenience of calculations. The units are: *ampère*, the unit of current strength; the *volt*, the unit of electromotive force; the *ohm*, the unit of resistance; the *coulomb*, the unit of quantity; the *farad*, the unit of capacity; the *volt-coulomb* (or *vomb*), the unit of work, and the *volt-ampère* (or *watt*), the unit of power. The relations are that an ampère is a volt divided by an ohm. An ampère is a coulomb per second. A farad is a coulomb divided by a volt. A volt-coulomb is a volt multiplied by a coulomb. A volt-ampère is a volt multiplied by an ampère. As these relations contain no coefficient other than unity, they express the relations between any quantities measured in terms of those units as well as the units themselves.

New York has recently done some very remarkable things in the way of mechanical ornamentation, if we may so term it. One of her leading buildings has, as a striking characteristic on its most prominent corner, an immense whip-socket some 30 or 40 feet long, which is used, like any other whip-socket, to hold a whip, or, in this case, a gigantic flag-pole. The latest phase of the mechanical decoration movement is in the ornamentation for letter carriers, who have recently been provided with a nice granite-ware "maslin" kettle instead of a hat. This, judging by appearances, is screwed upon the head by means of a set-screw, the hexagonal head of which is allowed to project from the top of the kettle, and while serving the useful purpose of adjusting the hight of the hat upon the head, forms, when neatly lacquered, a pleasing ornament to the bottom of the kettle. If the letter carriers' brains must be boiled, it is evident that the cheapest way in the end will be to boil them in a kettle where burning to the bottom will not prove injurious.

The reported large contracts with New York firms for arms and ammunition on Chinese account, we are convinced have little foundation. Inquiries in the trade disclose no facts of importance beyond the manufacture of a lot of cartridges, of which a considerable proportion have already been shipped.

A Conference of Eastern Ironmasters.

The following call has been issued in accordance with an understanding among ironmasters interested:

PHILADELPHIA, June 12, 1883.

DEAR SIRS: At the meeting of the Eastern Ironmasters, held August 24, 1882, at Coney Island, the undersigned were appointed an Executive Committee, with power to call the mill owners together should anything arise requiring united action. Such an exigency is now upon us, and we hereby call a meeting of the manufacturers of bars, rods, bands, hoops, ovals, plates, sheets, and other shapes of extra iron, at the rooms of the American Iron and Steel Association, No 261 South Fourth street, Philadelphia, on Thursday, June 21, at 2 o'clock p. m. The immediate object of the conference will be to form, if possible, a new schedule of prices above the base price for extra sizes of iron, so as to cover the changes made necessary by the new tariff law.

The schedule of extras adopted by the Eastern Iron Conference, October 16, 1879, has been widely adopted and almost universally observed, and it will be greatly to the advantage of manufacturers if they can adopt a uniform classification for the use of all interested to take its place, rather than leave each mill to adopt a separate schedule. The following are some of the reductions in the new tariff:

	Ct. lb.
Flats, larger than 6 x 2, ...	.7
Rounds and squares, larger than 2 inch,.....	.5
Flats, less than 1 x ¼,.....	.4
Rounds, " ¼ and not less than 7-16	.4
Squares, " ¼.....	.4
Sheet, " 1½ thicker than No. 20,	.4
Hoops, bands and scrolls, thinner than No. 20.....	.3

This is sufficient to show mill owners that the present schedule of extras requires immediate revision. Please meet us at place and time mentioned, and notify the secretary of your intention to be present.

Very respectfully, &c.,

Executive Committee. { OLIVER WILLIAMS, Chairman, A. H. PEACOCK, J. AVERY RICHARDS, JESSE L. COOLEY, WM. E. S. BAKER, Secretary.

No. 122 Race street, Philadelphia.

We regret that a copy of this call did not reach us in time for publication in our last issue.

Bullion Product of California.—A correspondent of the San Francisco *Bulletin*, writing to that paper under date of June 5, says: "The report of Mint Director Burchard, as published in your columns June 4, contains two important errors which should not stand uncorrected. The first is the allotment to California of $1,680,000 for the gold production for the year 1882. This is palpably a typographical error, as Nevada County alone has produced more than the total sum credited to our State. The presumption is that the director reported $16,800,000, and that a figure was dropped in telegraphing, as Wells, Fargo & Co. give gold productions for the corresponding year at $16,349,216. The assertion of the director that 'the suits brought to prevent the deposit of *débris* from placer and hydraulic mines have been virtually settled,' shows that the director has not taken pains to inform himself of the status of the *débris* litigation As a matter of fact, there are now more suits pending and more injunctions enforced than at any time since the inception of this litigation in 1876, and if these injunctions were granted in the United States courts, *ex parte*, as in the State courts, the production of gold would be diminished to something like the erroneous figures attributed to Director Burchard."

New York Bridge Trustees.—Mayor Edson, Comptroller Campbell and President Reilly, of the Board of Aldermen, met on June 15, in the Mayor's office, and reappointed the New York members of the Board of Trustees of the Brooklyn Bridge, as follows: John T. Agnew, John G. Davis, Henry Clausen, J. Adriance Bush, Thos. C. Clarke, Chas. McDonald, H. K. Thurber and Jenkins Van Schaick. Alderman Reilly voted for Arthur Leary in place of Mr. Bush, Charles H. Haswell in place of Mr. McDonald, and John H. Mooney in place of Mr. Van Schaick.

Professor Maynard, in connection with his paper on the Bower-Barff process, presented at the meeting of the Mechanical Engineers, gave a great number of exceedingly beautiful samples of cast and wrought iron treated by the process. They consisted of pipes, ornamental work of various kinds, plates, panels and parts of railings of a great variety of forms. One of the most complete tests of the permanence of this coating was given by the Professor in his paper. It seems that in France cast-iron urinals treated in this way have been in use for nearly a year, and are reported to stand without signs of rust. If this is true, it shows that the process is capable of giving cast iron a more perfectly protected coating than any other means at present known, for, certainly, nothing could be a more severe test for cast iron than use in a urinal. Even enameled ware fails whan subjected to this test, and paint, galvanizing, tinning and all the ordinary processes have given out so soon as to be hardly worth mentioning.

The Cleveland Meeting of the Mechanical Engineers.

Those who arrived in Cleveland before the meeting were impressed by the very complete arrangements made by the local committee and the secretary, and which tend so largely toward the success of a convention. The city was full of strangers, a very large medical convention having just closed, and many of the guests still lingering in town. Nature was in her holiday attire. Heavy rains had laid the dust in all directions, and railroad traveling was simply delightful. The broad and well-washed streets of Cleveland presented a remarkably handsome appearance. The day of the meeting opened with a regular Pittsburgh smoke, but during the afternoon a thorough downpour cleared up the atmosphere, and the weather for the evening session was all that could be desired. Fifty names appeared on the register at the hour when the meeting was called for, but the number was evidently considerably greater.

Opening Session, Tuesday Evening, June 12.

When the meeting was called to order in the rooms of the Vocal Society at the City Hall, there were over 100 persons present. Mr. Holloway, the president of the local committee, introduced the Mayor, Mr. John H. Farley. Mr. Farley's speech was an exceedingly happy one, and was in substance as follows: "Gentlemen, members of the American Society of Mechanical Engineers: I am unused to this kind of work, so that on this occasion you will excuse me if I do as you sometimes find it necessary to do, work from a template." Then producing his template in the form of a sheet of note paper, he proceeded to say:

"On behalf of the citizens of Cleveland, I have the honor of extending to you a cordial welcome. The presence in our city of so many eminent students in that most useful branch of science, mechanics, is a great compliment to Cleveland—a compliment for which I, as the representative of the city, heartily thank you. The selec ion of Cleveland as the place of this meeting is a compliment not altogether undeserved, because there are few cities in the United States that can more fully appreciate the grand results attained from the high state of perfection in mechanics, that mixed science which you profess and so ably represent. Our citizens will undoubtedly use every effort to reciprocate the honor you pay them, by making your stay among us as agreeable and pleasant to yourselves as the interchange of views by the members of your society must be beneficial to mankind in general. You will find in Cleveland many institutions that will repay a visit of the student concerned in the working of metals, and the various uses they bear to the economy of science, and the correlation and application of natural force to the general utility of man. As mechanical engineering is the great impulse of commerce and civilization, hemmed in by no narrow lines of code ethics, limited only by the laws of natural philosophy, your coming together in fraternal fellowship must result in stimulating study in the science of nature and force. Hoping that nothing will occur to mar your deliberations, and trusting (as I know they will) that our citizens—our manufacturers in particular—will do all in their power to aid you and make you comfortable, I again thank you."

President Leavitt, in reply, said: "Your Honor—On behalf of the society which I represent, I thank you most heartily for your kind words of welcome. When it was announced that the meeting of the society would be held in Cleveland, it was received with very general satisfaction, for we all had a desire to see the goodly city, the fame of which was in our ears, and our eyes have been gladdened by the sight. As you know, we are all a body of busy men; we are not given to much talk, and we prefer that our eloquence should be in deeds rather than words."

PAPERS READ.

The first paper of the evening was an exceedingly interesting one by Mr. J. F. Holloway, of the Cuyahoga Steam Furnace Co, of Cleveland, on the subject of "The Marine Engines of the Lakes, and a Device for Getting Them off their Dead Centers." Alluding to a little necessary delay in the opening of the meeting, Mr. Holloway prefaced his remarks by saying: "I have been called upon to read my paper and to show my little machine at this early stage of the evening for the purpose, I presume, of assisting this society in getting under way and in getting off of the center. I suppose it is true of large engineering societies as it is of large engines—I mean upright engineering societies and upright engines—they need some prying to get them off their centers."

The body of Mr. Holloway's paper is exceedingly interesting, and might have been expanded into three or four, treating of separate chapters of the same subject, and all of unusual interest, since they take up a subject which is really almost a sealed book to engineers along the seaboard. Mr. Holloway opened his paper proper by saying:

"The value of any mechanical device or invention is determined in the end by the necessity there is for its existence. A machine may be very elaborate and ingenious, but if the purpose for which it is created can be accomplished by a simpler and easier method, the complicated machine, no matter how carefully planned, will find no favor.

"This being so, it behooves me first to explain the necessity that exists for the device I have to show you, in order that the device itself may find favor in your eyes. The marine engines in use upon the lakes are almost entirely of the inverted direct-acting type. There are, however, a few side-wheel steamers with beam engines still used on the rivers emptying into the lakes, and for short coasting lines. By far the greatest number of these lake engines have single or tandem cylinders connected to a single crank. The next largest number in use are double engines attached to cranks placed at right angles with each other, while there are a few of the more lately-built double engines that have the cranks placed directly opposite each other. While I do not wish to occupy your time in reviewing generally the history of the lake marine engine, it is proper that I should say that it was upon these inland waters that the value of the screw propeller was first recognized as being the best method of propelling vessels by steam. I do not mean that the first propellers used were built here, as they were doubtless first built and used upon the inland canal routes between Philadelphia and New York. But I do mean that while the largest engineering establishments of our country—such as the Allaire, Secor, Novelty, and other large works—were persistently engaged in fitting out ships with beam engines and side-wheels, the engine builders here in the West were building screw propellers to take the place of the beam engines then in use here. There were even instances where beam engines that had been superseded here by the more compact and more cheaply-run direct-acting propeller engine were taken out of vessels and sent East to be used in sea-going steamers."

The facts mentioned in these paragraphs are quite remarkable, and show that where our engineers have been called upon to design and construct marine engines, even under difficult conditions, there has been no lack of talent to aid it, or of means for carrying out the work. The early propeller engines were simple high-pressure cylinders on wooden posts or gallows frames which rested on keelsons on the hull and gave excellent results. Many an engineer of the later times has wished, when he has had an engine hammering and pounding away on an iron bed-plate, for the engine of the olden time running so smoothly on its cushioned wooden gallows frame. Mr. Holloway continued:

"At the first the marine engine here was not only simple and non-condensing, but it was small as well. Steam cylinders from 16 to 20 inches bore were the rule. The vessels in which they were used ranged from 275 to 350 tons burden. These small boats, with their small engines, were at that time sufficient to accommodate all the business other than that done in sailing vessels. The growth of the country westward, however, soon gave an impetus to vessel building, and for many years there was a sharp rivalry between larger sailing craft and larger propellers. It is only recently that sail vessels may be said to have yielded to the inevitable, and now, as consorts or tow barges, very many of them do their sailing at the end of a tow-line. The day is past when any large-sized vessel dependent upon sails alone will be built upon these inland seas.

"The small propellers have in their turn been supplanted by steamers of 270 feet length, 40 feet beam, 20 feet depth of hold. The little "Puffing Billy" engines, whose snorting exhaust used to awaken the echoes along the heavily-timbered shores of these lakes years ago, have now given place to massive, cumbersome, compound engines, which, in addition to the large and heavily-laden hulls within which they are placed, often drag behind them one or more equally large and equally heavily loaded sailing vessels, or tow barges, and, so far as appearances would indicate, they do it without much effort. Unfortunately for both engine builders as well as vessel builders, while there has been such a large increase in the size of vessels, and in their engines and boilers, there has not been a corresponding increase in the width, and the capacity of the harbors of the lakes, or in the depth of the water at their entrances, or in the rivers connecting the chain of lakes together. In consequence of this fact, the large increase in the carrying capacity of the present vessels has been obtained mainly by adding to their length and beam, rather than to the depth of the hold. Since the strength of a hull is largely dependent upon the depth of its sides, and since the overhead arches, formerly used, have been found in late years to interfere with loading iron ore and lumber, the difficulty now is to build a hull that shall be strong enough to carry, in addition to its own cargo, the power required for its own propulsion as well as the power required to tow one or two vessels of the same tonnage behind it.'

At certain speeds, where the number of strokes comes into unison with the time of vibration of the hull, of course, the shaking is a very serious matter. With double engines, having cranks at right angles, the conditions are not improved. Not only are the cranks thus placed more difficult to balance, but besides the up-and-down thrust they have an athwart-ship motion, which produces a severe side thrust on the main journal bearings when the pins are on the same side. This side strain, in addition to and merging into the up-and-down motions, results in a sinuous motion of the hull, more destructive than the simple up and down first referred to. This, of course, is greatly increased when the engines are to any extent out of balance. The Amazon, in 1873, a twin-screw propeller, 240 feet long, 40 feet beam and 23 feet depth of hold, was the first successful attempt made to overcome this vibration. At 75 revolutions a minute the engine worked almost to perfection, so well had the reciprocating parts been balanced and the power distributed between the cylinders. There was so little vibratory motion that it was almost impossible to tell, in standing at the bow, whether the engines were in motion. A large propeller recently built, having fore-and-aft compound engines coupled at right angles, was so violently shaken during the first season that it was evident she could not long withstand the strain. At the close of her first season the cranks were taken out and placed beside each other. The result was that the hull no longer suffered from the motion of the engine.

This closed the historical portion, which it would seem desirable to have resumed at some future day. Growing out of the increasing size of these boats, the crowded state of the harbors, and the number of bridges through which vessels have to pass, the perfect control of the engines at all times becomes necessary, and, as the single crank or cranks placed beside each other are the best for the engines, the danger of being caught on the dead center is considerable, and a device for rapidly throwing them off is imperative. The machine which Mr. Holloway described is at once simple and effective. In its operation it consists of a steam cylinder having a piston-rod attached to a straight block with grooved face. The grooved wheel on the main shaft engages this face whenever an eccentric pulley just back of the block is turned into position. By admitting steam into the cylinder and driving the piston up and down, the wheel with which it is engaged and the main shaft are turned through a small angle sufficient to carry the engine off from the centers. The handles for working this apparatus are brought close to the steam reversing gear of the main engine. Therefore, when the engine is found to be fast, the valves are set properly, steam admitted to the main cylinders, and the auxiliary or starting cylinder put in motion. As its work is completed the cam-wheel rolls out of gear, the main engine goes on as usual, and the steam cylinder takes care of the starting block. The whole apparatus was exceedingly simple, and was illustrated by a neatly engraved diagram, which, for convenience, was distributed among the members. It was rather unfortunate, and we hardly understand the reason, that no discussion followed this exceedingly interesting paper.

WINDING AND PUMPING MACHINERY OF THE ANTHRACITE COAL REGIONS.

The next paper on the list was that by Mr. Howell Green, entitled "History and Development of the Winding and Pumping Machinery of the Anthracite Coal Regions." Mr. Green not being present, the paper was read by the secretary. Mr. Green's paper was largely devoted, as its title would indicate, to historical matters, and was treated in such a way as to be exceedingly suggestive to the modern engineer, who has to encounter to-day, with scarcely changed conditions, the same difficulties that were met by the first engineers who attempted to handle the excessively acid waters of the coal regions. The following extracts will give an idea of the scope of the paper:

"Very early in the progress of mining below water level it was seen that means had to be provided to hoist from 300 to 400 feet at one lift, so as to get space for breasts, to work the coal profitably, and the quantity of water to be raised was found to run into hundreds of gallons per minute. From the first, both slopes and shafts were used. The mine cars in the anthracite regions have always been large, starting in the early days at about 40 cubic feet capacity, and standing now at about 96 feet. The wheels of the cars have been from 12 to 20 inches diameter; 18 inches is now most generally used. The axles have been from 2 to 2¼ inches diameter. The gauge of the mine railroads varies from 30 inches to 48 inches; in a few cases it is 4 feet 8½ inches. At first chains were used for hoisting, and some of the early shafts had hemp ropes. Flat chains, or, rather, three chains side by side, with alternate large and small links, and with blocks of wood through the large link, were tried. These flat chains were wound on flanged spools like a ribbon. Iron and steel bands were used, but the conclusion of the greatest number now is to use iron-wire round ropes. Not that iron-wire ropes are better than steel-wire ropes, but questions of endurance, cost, &c., in relation to wear and weight and work in acid water, have rather been against steel-wire ropes. In a shaft no rope rollers are used, but on a slope—particularly one with varying pitches—the question of a roller to protect the rope is most important. While it has been a vexed question, yet after trial of hundreds of forms and many kinds of material, it seems to be considered that a hardwood roller about 8 inches diameter, truly turned and kept clean and clear, is the best for ordinary strains. It was soon found out, in using wire ropes, that the life of the rope was much lengthened by making the drums and sheaves of large diameter—the rope must spring around the drums and sheaves, and spring back, and not receive a permanent set.

"In regard to the first steam engines, we read with amusement that they were used for hoisting and for pumping the water, combining both duties, and were single high-pressure engines with flat bed-plates bolted on wooden frames. The steam cylinder would be perhaps 18 inches diameter, with 6 feet stroke. A cast-iron crank-shaft, with perhaps a 10-inch journal, carried the heavy fly-wheel. On the crank-shaft there was a pinion 30 inches diameter, of 3 inches pitch and 12 inches face, which geared into a drum-wheel 60 inches diameter, which was just above the pinion. Just under the pinion was the pumping wheel, 8 feet diameter; this pumping wheel had holes in it to receive a pin for working the pump. The drum shaft was of cast iron, with perhaps an 8-inch journal; its body, as that of almost all other shafts then, was octagonal, and the drum-wheel spiders and almost everything else was staked and keyed on by the methods of the old millwrights. The drum was from 5 to 8 feet diameter, and about 11 feet long, and was formed of hardwood laggings bolted on spiders. To wind a car 400 feet with a 5-foot drum, the engine would have to make about 48 revolutions, which it was made to do in about one minute. The pumping shaft was also of cast iron, with perhaps 11-inch journals; and the drum-shaft was lifted in and out of gear by a strong wooden lever, one of the pillow blocks being hinged for that purpose. The pump was, of course, near the bottom of the mine, perhaps 400 feet away. It was a lifting pump, 16 inches bore, 7 feet stroke, fitted with a bucket faced with sole leather, the rod of which went through a stuffing-box in a goose-neck, or turn-piece. Up the slope or shaft went a wooden rod, 8 inches square, carried on flanged rollers. The rod was spliced with plates 4" x ⅝" x 10 feet, and on top of the slope or shaft were one or more rocking bobs provided with great balance boxes."

No small amusement was created in the society by the description of the valve-gear of one of these engines, which consisted of two eccentrics and rods with hooks on the ends, which the engine man lifted in and out of gear with his feet, leaving his hands free for full control of the slide-valve. This was operated by a long bar. A stove-pipe damper throttle-valve regulated the supply of steam. One can hardly credit the fact that 30 years ago such a pumping and hoisting engine was considered first-class work, and it seems hardly credible that there are many of these old fellows yet at work. "Such an apparatus was subject to many mishaps. With a heavy fly-wheel whirling around, and the slide-valve at the will of the engine man, unnecessary strain could be easily thrown against the engine, and broken cranks and shafts were often the consequence. Also, if in lifting

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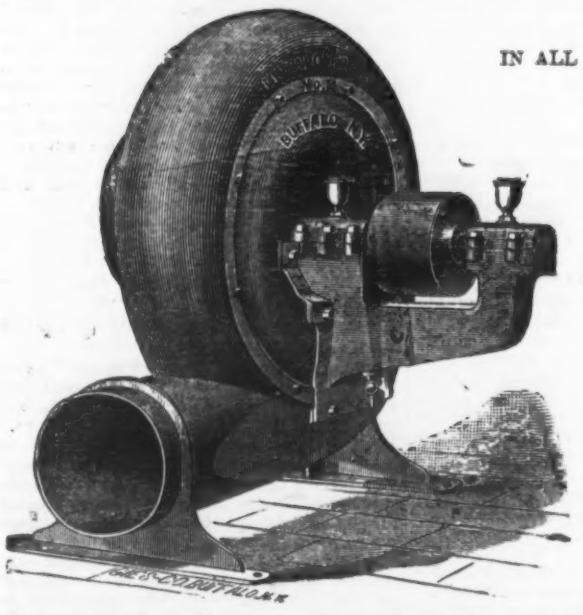

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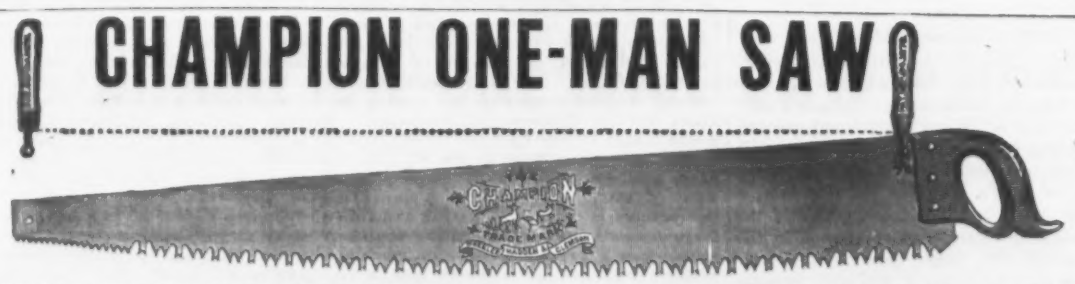

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the drum out of gear it was not securely scotched, the unbalanced end of the chain would fly down the slope or shaft. When it was necessary to connect or disconnect the pump rods, the rocking bobs had to be securely blocked, and sometimes the assistant forgot to take out the last block—and then trouble came. This state of affairs was much improved by putting up another engine, so that one engine could pump, and the other one could hoist. Next it was discovered that two engines could be attached to the same shaft, at right angles to each other, so that no fly-wheel would be wanted. Yet on some of the first pairs so built, small fly-wheels were put on—probably to verify Darwin's theory of gradual development. The first of these double engines had two eccentric hooks to each engine, making four in all which the engine man had to lift with levers, now that he had two engines to handle, and it took a lively man to do it; but since there was little or no fly-wheel, no great danger was incurred. The engine man therefore hooked one engine in and started the load with the free engine. The double engines with four hooks did very well. Next, links for valves were introduced, and they are now generally used.

"It was found that hoisting and pumping engines in which cog-wheels were used were subject to noise and breakdowns, and as the miners went deeper it was found that the drums keyed immediately on the crank-shaft of a double engine did the best. This change, of course, involved larger steam cylinders, and, in the place of wood-faced drums, cast-iron ones were made, which soon led to the use of spiral grooves to keep the ropes from chafing. Still further, these drums were made conical, so that when the heavy load was to be started the small end of the cone did the pulling, while the empty car (and cage, if in a shaft) pulled by the large end of the cone on the other side. This arrangement is the best yet tried—and so the hoisting engines stand to-day. These are strongly built double engines, on strong stone foundations, with steam cylinders from 20 to 40 inches diameter and stroke from 4 to 6 feet. There are heavy wrought-iron shafts, spiral-grooved cast-iron conical drums, steam brakes and steam reversing gear, with appliances to prevent overwinding, with safety catches and detaching gear; and, barring waste of steam, the world can show no better hoisting engines than are in the anthracite coal regions of Pennsylvania."

Many a mechanical engineer will appreciate the difficulties which the auther describes as follows:

"Perhaps the most discouraging situation for a mechanical engineer to be called to in the anthracite coal regions, is to have to provide the remedy for an old drowning mine, where the vein is large, the pitch steep, the top bad, the mine full of fire-damp, the timbers old and rotten, and the water so full of acid that it will eat up a shovel in a night, with the air so close that one can hardly breathe. On these occasions darkness and danger are our companions, and great expense and long delay are our inevitable followers.

"The first mining pumps used were of the Cornish pattern—the old drawing lift, with an iron bucket faced with leather. This leather was held in place by a wrought-iron or brass ring which nearly fitted the working barrel, and was driven full of wooden pegs. If the working barrel was made of hard iron and the length of the rod nicely adjusted, so that the leather would come slightly above the bore in the up stroke, and if the water was clean and not acid, and the lift not too heavy—then this is still the best mining pump ever made. The red-ash veins were the first ones worked below water level, and the water in red-ash mines will not, as a rule, eat up iron; but when slopes and shafts had to be sunk on the white-ash veins, there the lifting pumps would not do. The sulphuric acid in the water ate them up. Some brass-working barrels and brass rods were tried, but they were expensive and short-lived. Open-topped force pumps were made, hoping that they could be lubricated and made to stand, but the general conclusion arrived at, about the year 1848, was that plunger pumps must be tried. Since that time they have been generally used, and the reason for their longer life is that plungers can be lubricated and the corroding action of the acid water lessened. As the first lifting pumps were worked by rods running up to the engine, quite a change in balance boxes occurred when lifting pumps were changed to plungers, and about this time quite a number of double-acting pumps were put in. These pumps, of course, discharged water at each pass of the piston, and had four valves instead of two. About the year 1854 or 1855 the Bull engine and pump were introduced. These did away with cog-wheels for pumping, as the pump rods were fastened to the piston-rod of the steam engine. No fly-wheel or crank was necessary on these engines, since the cylinder was made large enough to lift the rods, which were made heavy enough to force up the water on their downward stroke.

"These engines and pumps have been a real success. They had to be very strong, from the nature of the case. The valve gear is beautiful. It is the result of 100 years' experience in Cornwall, from whence the idea came. The engine man has to be a man of good judgment, as he deals with very heavy weights. Yet, as regards consumption of steam, the two-valved engine of the anthracite coal region compares very unfavorably with the three-valved Bull engines of Cornwall

"About the year 1860 steam pumps began to be used in the coal mines. The great departure being in bringing the engine and pump together, and from the unfortunate nature of the case, the engine had to be taken down in the mine 500 to 1000 feet from the boilers. Here commenced another trouble, which is the great loss of the power of the steam so conveyed. Strange as it may seem, the old war between acid water and pistons and rods had to be fought over again, and the acid water came out ahead with steam pumps, just as it did with lifting pumps.

"This paper must be too short to go over all the questions of steam pumps, with their valve movements—positive, isochronal and steam-moved—of pumps alternate and reciprocating, with bronze linings, rods and valves; with roomy valve-chambers and easily changed seatings, &c., with air chambers and air lodgments, together with questions of relative size, speed and portability. To pump acid water, a plunger seems the best, because it can be protected by grease (in cold water), and the action of a piston on the lining of a pump will even hasten the corroding action of the acid water; that steam carried 500 to 1000 feet, in pipes ever so well covered, will lose much of its power; that ordinary high-pressure steam engines, using such steam and making no use of the principles of expansion, are great wasters of steam; that centrifugal pumps, even with short lifts, will hardly do for acid water; the ponderous engines of Cornwall, or the splendid examples lately set up at our American water works, are too costly for the changing locations incident to anthracite coal mining; and that while, to men who daily see hundreds of tons of good culm thrown away, small savings of steam seem foolishness; yet in view of the great fact that in the best steam pumps in the coal regions the fuel used is four times as much as it might be, there seems room for improvement on that score. As the pumps now stand in the anthracite coal region, those which use the least fuel are the old pumpers, worked by engines on the surface, using cog-wheels and pinions. Next in point of economy are the Bull pumps. Then follow various kinds of steam pumps—good, bad and indifferent. None use the principle of expansion to a very great degree, and the duty done by 100 pounds of coal may be stated at from 10,000,000 to 20,000,000 pounds of water raised one foot high.

"The pumping of the water of the anthracite mines is an ever-increasing trouble. The mine widens, the outcrops fall in, and, as the quantity of coal to be had decreases, the water increases. For this state of affairs there is no help. Some colliers in the middle coal field use, at certain seasons of the year, 100 tons of coal per day for pumping water, to raise 8,000,000 of gallons in 24 hours from a depth of 400 feet. When wet seasons come on, the water in the mines gets more troublesome on account of acid which is extracted from the rubbish left in the mine. The water of the mines is not good for use for purposes of condensation, because, when heated to 100°, it acts on iron with increased force. Fresh water gets more and more scarce, and water is brought long distances by pipes, and often in cars, to supply the boilers, and in some districts good artesian wells are bored. Here, however, another trouble comes in: if the holes go down too deep, the mountain limestone is reached, and lime is more troublesome than sulphuric acid. But by mixing the two together, under intelligent care, a good water is obtained.

"And so the situation is. The question that to-day troubles the minds of many engineers in the coal regions is, How had we best build our mine pumps—shall we stick to the old method of a plain steam pump, with no expansion or condensation, because it is so handy to put in and take out? So far as the pump alone is concerned, the answer seems 'yes;' but when we see the long row of boilers, and immense piles of fuel for them, it calls attention to the other side of the question."

ECONOMY IN LUBRICATION OF MACHINERY.

Mr. Comly's paper on "Economy in Lubrication of Machinery" was next read. His matter was very suggestive, and showed in a conclusive manner how great a saving may at times be effected by a proper selection of the lubricating material. The paper was as follows:

"In large manufacturing establishments the sum of money paid annually for lubricants is surprisingly great, and where oil is the lubricant the quantity is a very large percentage of the total amount purchased. Being convinced that such was the case, I endeavered to ascertain the actual quantity of lubricating material used in a given time on the various machines and in the various shops connected with the establishment at which I am engaged. The result was startling, and the investigation proved that one of the most extravagant users of oil was the vertical engine used for driving the principal part of the works used for machine shop and bridge construction, &c. The engine was nominally 60 horse-power, with 16-inch cylinder and 18-inch stroke, with an 84-inch diameter pulley, making 106 revolutions per minute, but the indicator cards were evidence of the fact that frequently 83 horse-power were produced by the engine. Owing to the fact that the engine was overloaded, the crank-shaft bearings and crank-pin gave much trouble by heating, and occasionally it was necessary to stop the engine during working hours. The expense for lubricating oils on this engine during the month of May, 1882, was at the rate of $3\frac{8}{100}$ cents per hour of the time during which the engine was actually running. The oil used was cosmolubric No. 2, costing 65 cents per gallon, and the specific gravity of the oil was 26° Beaumé. During June the oil cost was $3\frac{9}{100}$ cents per hour run, and the engine was running 120 hours per week, or an average of 20 hours per day.

"About the 1st of July I commenced using No. 10 lubricine grease on the crank-shaft bearings, instead of oil, and the result was that the engine-shaft bearings worked much cooler, gave no more trouble, and the cost of the lubricating material was reduced to $1\frac{15}{100}$ cents per hour run. The crank-pin at this time was still using oil, and continued so doing until October 9, when I had a copper box attached to the stub-end of the connecting-rod close to the crank-pin, with a ½-inch tube connecting the box with the crank-pin bearing, and No. 4 lubricine grease packed in it; No. 10 lubricine was also applied to the guides for the cross-head, the result being that the cost of lubrication was still further reduced to $\frac{75}{100}$ of 1 cent per hour run, and the guides and pin worked much cooler than they did previously when oil was used. A mixture of palm grease and beeswax in proper proportions will compare favorably in efficiency to the lubricine grease. I have also found mixtures of beeswax and tallow or beeswax and suet to work very well as lubricants for shafting. The relative proportions must, of course, be made to suit circumstances.

"During the past eight months the line

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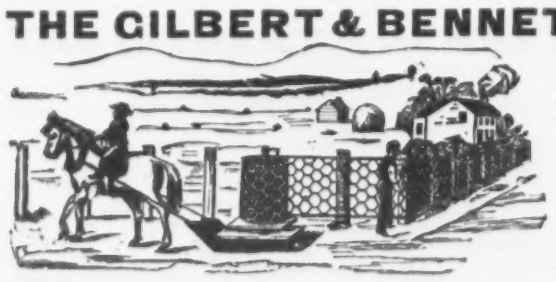

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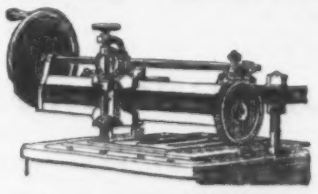

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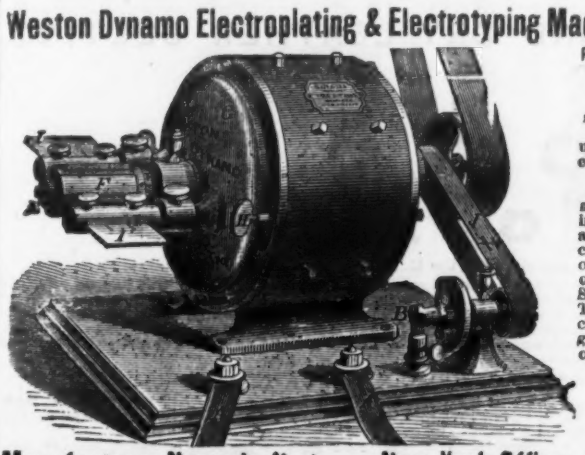

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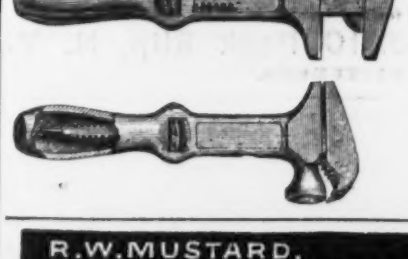

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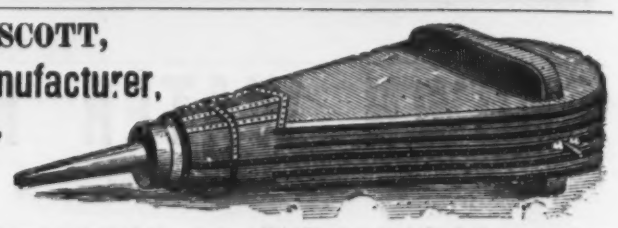

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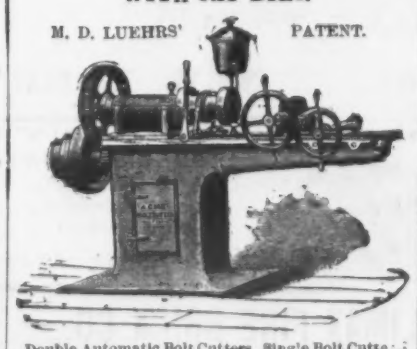

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for oiling valves and cylinders of steam engines by the only perfect method, **through the steam pipe.** The oil passes in sight, drop by drop, into the column of steam, where it vaporizes, thus becoming a steam lubricant, oiling perfectly every part reached by the steam. Any clean oil, black or white, light or heavy, may be used. Saves from 25 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on 30 days' trial if desired. In ordering, give diameter of cylinder.

Note.—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "sight feed" feature, a decree was rendered in our favor August 22, 1881. Address,

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shafting has been running without oil, depending exclusively on the mixtures such as already described. The shafting is all provided with ball and socket hanger boxes, and the top half of the box has two cups cast in it, in which the grease is packed, each having a cast-iron cover fitting closely over it to keep out the dust. This cover is chained fast by a very light chain to prevent it from being lost or knocked down by ladders, &c. The center oil-hole, where a self-oiler is usually placed, should be stopped up with a cork to keep out dust at that point, and the use of oil is not allowed on any of the shaft bearings where the grease can be applied. By the regulations already described, the cost of lubricants has been reduced 44⅛ per cent. in the cases noted above. Means have been provided for using the grease on nearly all of the engines running at the works and on several of the heavy machines, the result being a saving of lubricant and cool running of the journals. It is better when applying the grease to make large holes in the caps of the bearings (perhaps 1¼ or 1½ inches diameter, if allowable), and permit the grease to be packed directly on the journal surface. Where this cannot be done, a funnel-shaped cup is attached to the oil-hole, in which is a copper rod, one end of which presses against the shaft while the other end passes through a spiral spring, which is tightened to the required tension by a screwed cap. The cup is filled with the grease, and the rod passing through it melts the grease by the heat caused by the friction of the copper rod on the journal, the spring being tightened sufficiently to produce the necessary friction on the end of the rod. Plain copper boxes, however, are frequently preferable, with lids to keep out dust. A piece of copper rod run through the center of the box touches the shaft, and the hole between box and shaft is made much larger than the size of the rod of copper, so that the grease can be well pushed down on to the shaft."

DISCUSSION UPON MR. COMLY'S PAPER.

A decidedly interesting discussion followed the reading of Mr. Comly's paper.

The President said: Discussion on this paper is in order, and the Chair hopes that there will be some discussion. It seems as though Mr. Holloway did not get the society "off the center," and it needs "lubrication," which I suppose will come after a while, and if we can run without "dry boxes" I hope there will be something said.

Mr. Grant inquired: I would like to ask the gentleman whose lubricine he uses?

Mr. Comly: The lubricine which we have used principally is sold, and I think manufactured, by R. J. Chard, No. 6 Burling Slip, New York.

Mr. Grant: We have it in our machines—the same thing—and it has run perfectly cool for 18 months. We have not used a drop of oil. We had one very quick rolling machine for 18 months, and it has been perfectly cool; we have not used a drop of oil on the line.

Mr. Comly: This engine, as I said, was giving constant trouble, and it seemed as if it was overloaded. Sure enough, it proved that by our indicator cards, and we were agitating the subject of putting in a heavier engine right away, when I finally struck on this mode of lubrication, and instead of the main bearing running hot all the time and keeping water on it, we removed all supplies of water, and it runs perfectly cool now, so that you can scarcely feel any heat there at all. The metal was brass originally, and ran hot, and in heating, of course, the tendency was to inclose on the shaft. The box was made in two halves, divided on a horizontal line, and of course, after being heated and inclosed on the shaft, it had to be loosened by scraping, and that was done several times, but it still ran hot. Then there was an anti-friction metal composed of lead and antimony put in, which we found to be a very excellent anti-friction metal. But it still heated. Then we used very heavy bodies of cylinder oil, the heaviest we could get, and it still ran hot. But, when we put the lubricine in, it seemed to remove all difficulty.

Mr. Grant: I would like to ask the gentleman what the small springs are?

Mr. Comly: The small spring is on a little copper rod which Mr. Chard furnishes with his cups. The end of the rod passes through a little cap, and the spring presses against the under side of the cap; that cap is adjustable on the top of the cup by means of a screw. The cap is to be screwed down just enough to produce sufficient pressure on the rod to keep the necessary friction on the rod. We generally prefer, wherever it is possible, just to put on a plain funnel-shaped cup with a 1¼ or a 1½ inch hole, if the bearings will allow it, and just put a rod inside of that, and nothing more, and may be once a day a man will go around and push grease on it.

Mr. Grant: Our cups are made with similar wire, but no spring; a $2\frac{7}{8}$ shaft, running 120 revolutions per minute—we have one that is running, I guess, nearly 2000—never touched the rod since it was built.

Mr. Comly: When once the lubricine is well worked in and the dirt worked out, it just seems to lie there and keep the parts from touching each other, and they run with very little friction. One of the members asked me if I had taken any cards to indicate the difference in horse-power before applying the grease and afterward, and I remarked that I had not. The decrease of temperature of the bearings would seem to be sufficient evidence that the friction was decreased.

Mr. Woodbury's remarks, which we give below, bring out the fact still more clearly that it is absolutely necessary, in selecting the oil, to consider the kind of machinery and the pressures and speeds at which the bearings are to be run; otherwise it might be supposed that the conclusions reached, from a consideration of the facts given by the two gentlemen, would be in diametrical opposition:

COST OF FRICTION.

Mr. Woodbury: Mr. President—The expense of an oil or a grease does not represent the whole cost which should be charged to friction. With a grease the consumption is less, and the cost with the lubricant is much less than with oil, but in those cases where I have had some personal knowledge, the friction has been increased by the substitution of the grease for the oil. This winter I went to a Fall River mill where the predecessor of the present agent had invested $2400 in providing all his shafts with grease cups, and was using a grease which required a change but once in six months. The cost of that grease was much less than oil, but he had suspected that the friction was excessive, because he knew what power the rest of his machinery ought to take, and his mill was using more power than those of his associates. And yet he hesitated to make a change, because it would cost $1400 to provide the journals of those shafts with oil-cups and he would have to abandon the grease-cups, making $3900 in dead plant upon the oil and the grease-cups. However, the grease-cups were removed from the hangers of the line of the shafting on one side of the carding-room, and replaced by oil-cups. Some time after this change had been made I made some observations and found that, upon the side of the room where the shafting was lubricated with oil, the temperature of the frictional surface in the hangers was only 8° greater than that of the room. On the other side of the same room, on a similar line of shafting running the same amount of machinery, doing the same work, and under the same supervision, but lubricated with grease, the heat of the frictional surface of the journal was 38° greater than the temperature of the room. Now, that excess of heat means, of course, that the work of the engine was converted into heat, and it is certainly an expensive way to warm a room (laughter), and, of course, it also represented an additional amount of coal under the boiler. The frictional surface was moving at the rate of about 175 feet a minute, and the pressure was 14 pounds to the square inch. I took samples of these lubricants, and tried them on my oil-testing machine, and found that the friction of the grease at 128°, 14 pounds pressure per square inch, 175 feet velocity a minute, was 33 per cent. greater than the friction of the oil at the same pressure and velocity, and at a temperature of 98°. Supposing that difference would hold good, it would warrant almost any expenditure in changing the oil-cups and in using oil in place of grease. However, in using a grease or any lubricant, of course it is necessary to use one whose viscosity is enough to enable it to adhere to the surface of the metal. If the journal is rough or out of line, or the pressure or velocity excessive, why, as a lesser evil, then a grease or a less fluid oil must be used. In the case of Mr. Comly's a 26-gravity oil was a rather light oil to use upon the engine. A 24 Beaumé is what is more generally used. In the light pressure of the machinery used in cotton manufactories there has been a great change to the lighter oils within the last few years—to those of lighter gravity and more fluidity—because the diminution of friction warranted a greater expenditure of oil. One of the mills in Manchester, N. H., was using its water privilege to its full limit. They changed their oil from about 28 Beaumé to 32, and the friction diminished to such an extent that the production increased 5 per cent. with the same consumption of water. In another mill I suggested as most suitable for the condition of lubrication in that instance that a mixture of sperm and paraffine be substituted for the mixture of lard and paraffine oils then used. Some time later the agent of the establishment told me that he didn't know what "coefficient of friction" meant, but he had followed my advice and now ran his mill with the gates to his water-wheels partly shut. (Laughter.) Had I known that this question was coming up in this form, I should have certainly brought some of my note-books with me; but I trust that by the time of the next meeting you will make observations on your own account, noting the cost and the quantity of the lubricant. For the heavier bearings and those running at excessive velocities, the heavy greases must be used as the only method in which the work can be satisfactorily and safely lubricated. (Applause.)

At the close of the evening session on Tuesday those in attendance partook of a savory repast which had been prepared by the ladies in the room adjoining the one occupied during the meeting. The occasion was a very pleasant one, and everything passed off in a manner highly satisfactory to those concerned.

Wednesday's Sessions.

The first paper read in the morning session of Wednesday was by Mr. W. F. Durfee, of Bridgeport, Conn., on the subject of "Balancing Vertical Engines." Following it was a paper by Mr. H. R. Towne, of Stamford, Conn., on "Cranes—a Study of Types and Details." "Beton in Combination with Iron as a Building Material," a paper by Mr. W. C. Ward, of Portchester, N. Y., was next presented. This paper, which describes a novelty to many in building construction, narrated at the outset the incident which led the writer to the experiments leading up to the construction he described. After speaking at length of the manner of using in buildings, Mr. Ward presented the following facts as conclusions derived from his experience:

1. That a system of iron beams reinforced with beton can be made to sustain weights many times greater than the iron beams alone can withstand without reinforcing.

2. That floors and roofs can be economically made with beton, reinforced with iron rods, capable of sustaining heavier loads, with a less number of supporting beams, than any other system of flooring and roofing now in use at equal cost.

3. That the system of reinforced beams and floors affords advantages for a more perfect system of heating buildings uniformly than by the steam or hot-water systems.

4. That the sanitary requirements of complete ventilation are plainly within the reach of this system of construction.

5 (and finally). That it affords a perfect defense against the interior destruction of buildings by fire.

The afternoon session on Wednesday was called to order at 2.30 o'clock. Prof. G. W. Maynard, of New York, read a paper on the "Bower-Barff Process for Rustless Iron." We gave the substance of a similar paper read before the Boston meeting of the Mining Engineers some months since, so that the topic is one with which our readers are already somewhat familiar. Mr. W. J. Baldwin, of New York City, next read a paper on "Standard Cast-Iron Fittings. Mr. Wm. Kent, of Pittsburgh, read a paper on "The Evaporation Value of Various Coals," in which a number of very interesting and important tables were presented.

Prof. J. B. Webb, of Cornell University, read a paper on the subject of "The Reuleaux Kinematic Models." At the conclusion of this paper a telegram from the Stevens Institute of Technology, signed by Professor Thurston, announcing that the degree of Doctor of Engineering had been conferred on President Leavitt, was read. This met with great applause, and continued until Mr. Holloway introduced the gentleman referred to as Doctor, who stepped forward and said: "Gentlemen: We have in our family a doctor of medicine and a doctor of divinity, but this is the first instance that we can claim a doctor of engineering. I owe the honor in a great degree to the society which I represent. I thank you." The society then adjurned until Thursday evening at 7.30, the day being devoted to excursions

Wednesday evening the members attended a reception tendered by citizens of Cleveland, through a committee consisting of well-known gentlemen, at the Opera House. Six hundred invitations were issued, and nearly that number of guests responded. The visitors were very freely introduced to the assembled citizens, and passed the evening in an entirely social manner, while music, very finely rendered, made the occasion still more enjoyable. All formality, so far as possible, was avoided, and there was a corresponding freedom from restraint. The beautiful interior of the Opera House was brilliantly illuminated, and the live coloring of the boxes and proscenium were vividly brought out. A temporary flooring was laid from the footlights of the stage to the parquet circle for the convenience of promenaders The stage was beautifully set. Chandeliers depended from the flies, which were concealed behind wavy masses of parti-colored gauze. The wings were concealed behind two elaborate reproductions of modern mansions. To the rear, and facing the auditorium, was a fanciful little cottage with a jutting portico. At 10 o'clock the curtain was rolled back from the stage, disclosing tables laden with choice delicacies, while the rear scene was divided and brought into view the Arion Quartette. Lunch was then served. Selections were sung by the quartette at intervals during the remainder of the evening.

Further particulars of the meeting, which was in every way the most successful this society has yet had, will be given next week.

The New York Metal Exchange Membership.

There seems to be quite a "boom" in seats just now, and we understand that members of the cotton, coffee and other exchanges are coming in to take a hand in the transactions on margins, and "show the boys how it is done." On Monday the members decided to create and sell 40 new seats at $250 per seat, provided the applications therefor be made on or before July 1; 50 seats at $350 per seat before July 15, and 50 seats at $500 a seat if the applications are made before September 1. After the latter date the initiation fee will be $1000. Each member elected is entitled to one share of the stock of the concern. Applications were filed on Monday for 41 of the new seats On Tuesday 12 seats were sold at $300 each and two at $325. Five or six more were sold on Wednesday at $325 and one at $340. All the $250 seats having been taken, there are now applications for 23 of the 50 which are to be sold for $350. On and after June 25, 'change hours will be from 11 to 11.30 a. m., and 1.30 to 2 p. m., with a daily call at 11 a. m.

The Secretary has issued the following list of officers and members of the New York Metal Exchange, corrected to date:

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Vice-President—Frank Dickerson.
Treasurer—Carl Mayer.
Secretary—Edward J. Shriver.
Managers—John C. Cook, Joshua Hendricks, Theo. Sturges, John T. De Blois, Elliott F. Driggs, Wm. P. Tilton, B. F. Judson, John J. Williams, E. P. White, A. W. Humphreys, H. B. Moore, A. G. A. Harnickell, D. Houston, E. S. Wheeler.
Arbitration Committee—D. Thomson, C. E. Maxwell, E. A. Caswell, Daniel F. Cooney, Austin G. Gorham.
Inspectors of Election—S. Mendel, George Nissen, U. O. Crane.

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Brinsmade, J. B., of Ed. Bech & Co., 69 Wall street.
Brinckerhoff, C. M., of Fred'k Spring & Co., 124 Front street.
Budd, Palmer, of Ladenburg, Thalmann & Co., 50 Exchange Place.
Burrows, W. M., Pier 11, North River.
Cahn, Jacques, of Lewisohn Bros, 121 Greene street.
Caswell, E. A. 109 John street.
Chandler, R. P., of Chandler & Du Bois, 51 South street.
Chertizza, J., of Demartini & Chertizza, 5 South William street.
Clark, B. G., of Thomas Iron Co., 52 Wall street.
Cobb, Daniel L., of H. W. Adams & Co., 56 Pine street.
Combs, Jas. S., 129 East 11th street.
Cooper, Wm. B., Jr., 168 Pearl street.
Cook, Jno. C., of Bruce & Cook, 190 Water street.
Cooney, D. F., 88 Washington street.
Cochrane, Wm., of Wm. E. Potter & Co., New York Produce Exchange.
Coschina, F., F. of Coschina & Co., 15 Union street, Brooklyn, N. Y.
Couillard, Jos. H., of Gonlard, Rouse & Bostwick, 36 Whitehall street.
Crane, H. P., and Crane, U. O., of U. O. Crane & Bro., 2 Platt street.
Delafield, T., 95 Liberty street.
De Blois, J. T., of Jere Abbott & Co., 23 Cliff street.
Demartini, F., of Demartini & Chertizza, 5 South William street.
Detrick, J. D., of Thos. B. Inness & Co., 115 Broadway.
Dickerson, Frank, of Dickerson, Van Dusen & Co., 29 Cliff street.
Driggs, Elliott F., of Elliott F. Driggs & Co., 113 Water street.
Drake, H. Ingalls, of Lovejoy & Drake, 101 Reade street.
Eaton, Geo. B., 570 Pavonia avenue, Jersey City, N. J.
Eddy, Lewis B., 221 Pearl street.
Egleston, H. P., 166 South street.
Eilshemius, H. G., Jr., of J. Eugene Robert, 30 Maiden Lane.
Ellis, W. R., 72 Wall street.
Eustis, Wm. E. C., of Orford Nickel and Copper Co., 37 Wall street.
Flagler, J. H., of National Tube Works Co., 104 John street.
Flynn, J. A., of Allston, Gerry & Co., 68 Wall street.
Foster, A. T., of Peck Bros. & Co., 73 Beekman street.
Firpo, Carlo, of Slocovich & Co., 74 Broad street.
Froment, Frank L., of F. L. Froment & Co., 112 John street.
Gallaudet, P. W., of P. W. Gallaudet & Co., Wall and Broadway.
Georgiades, C. D., 19 Cotton Exchange.
Gillet, L. M., of Edward Bech & Co., 69 Wall street.
Goebel, Max, of J. L. Mott Iron Works Co., 88 Beekman street.
Gorham, A. G., of Chateaugay Ore and Iron Co., 21 Cortlandt street.
Gorham, F. G., of Albany & Renssalaer I. & S. Co., 56 Broadway.
Gordon, Geo. G., of Pickard & Anderson, 89 Gold street.
Greig, Geo., of A. A. Thomson & Co., 215 Water street.
Gretsch, Wm., of Gretsch & Mayer, 98 Fulton street.
Gummey, W. T., of Gummey, Spering, Ingram & Co., Philadelphia, Pa.
Hagan, Wm., 9 Burling Slip.
Hahn, Fred., of J. A. Jansen & Co., 15 William street.
Hardy, Wm., 51 Pearl street.
Hart, Lucius, of Lucius Hart & Co., 10 Burling Slip.
Hart, Jno. F., 20 Water street.
Hart, Wm. R., of Bond, Parsons & Co., 104 John street.
Harnickell, A. G. A., 83 Maiden Lane.
Hatry, A. G., Pittsburgh, Pa.
Hazard, T. D., 204 Pearl street.
Heineman, Adolph, of J. L. Mott Iron Works Co., 88 Beekman street.
Hendricks, Edgar; Hendricks, Edmund, and Hendricks, Joshua, of Hendricks Bros., 49 Cliff street.
Hernsheim, L., 20 Nassau street.
Herrman, N., of Herrman Bros. & Co., 80½ Pearl street.
Herzberger, Louis, of, Lehman Bros., 48 Exchange Place.
Hilton, E. G., 114 John street.
Holland, Chas. H., Continental Hotel.
Homan, C. E., of John Boynton's Sons, 32 Broadway.
Hoopes, Evan T., of Hoopes & Merry, 539 West 15th street.
Hopkins, S. T., 240 Pearl street.
Hornidge, W. H. of Harrington & Hornidge, 155 West 48th street.
Houston, D., 22 Platt street.
Houston, Wm., of Wm. Houston & Co., 71 William street.
Hoyt, Jas. K., of Jere Abbott & Co., 23 Cliff street.
Hoyt, Sherman, of C. R. Hickox & Co., 3 State street.
Hubbard, Chas., 36 Cliff street.
Humphreys, A. W., of Sterling Iron and Ry. Co., 42 Pine street.
Irvin, Richard, Jr., of Richard Irvin & Co., 37 William street.
Ives, Wm. Jay, 52 Broadway.
Jackson, H. C., 88 Wall street.
Jansen, H. L., and Jansen, John A., of John A. Jansen & Co., 15 William street.
Jardines, T. A., P. O., New York.
Jennings, S. A., of Bruce & Cook, 190 Water street.
Johnson, R. C., 570 Pavonia avenue, Jersey City, N. J.
Jones, A. A., 111 Broad street.
Joosten, D. H., of Joosten & Debordes, Amsterdam, Holland.
Judson, B. F., 457 Water street.
Keller, Frederick; Keller, Geo., and Keller, Geo. F., of G. F. Keller & Co., 90 Ninth avenue.
Kinner, John D., 52 Center Market.
Kimberly, P. L., of P. L. Kimberly & Co., Sharon, Pa.
Knapp, Chas. C., 9 Burling Slip.
Knowles, F. E., of John Boynton's Sons, 32 Broadway.
Kohn, S. H., Chrome Steel Works, Kent avenue and Keap street, Brooklyn, N. Y.
Ladenburg, A., of Ladenburg, Thalman & Co., 50 Exchange Place.
Leavitt, C. W., 161 Broadway.
Leech, John E., and Leech, Wm. E., of Jas. Lee & Co., 72 Pine street.
Lehmann, F. L., Naylor & Co., 99 John st.
Lehmaier, M. H., of Lehmaier, Schwartz & Co., 501 First avenue.
Lamarche, H. J., H. Lamarche's Sons, 80 John street.
Levis, Aaron; Levis, Sigmund, and Levy, Berthold, of Levy & Levis, 81 Pearl street.
Lewisohn, Adolph; Lewisohn, John, and Lewisohn, Leonard, of Lewisohn Bros., 121 Greene street.
Limburger, A., of Ladenburg, Thalman & Co., 50 Exchange Place.
Lissberger, L., of L. Lissberger & Co., 46 Cliff street,
Little, F. S., of Fred'k Spring & Co., 12 Front street.
Loeb, Willy, 64 Beaver street.
Loesch, R. C., Jr., of A. A. Thomson & Co., 215 Water street.
Lyon, Geo. L., 165 East Forty-ninth st.
McAnerney, Jno., of Jno, McAnerney & Co., Church and Rector streets.
McDonough, Jas., of Central R. R. of N. J., 119 Liberty street.
McNider, Jas., 138 Water street.
Matthews, Chas. W., Philadelphia, Pa.
Marval, H. C., of Marval Bros. & Co., 142 Pearl street.
Marvel, Wm. D., 70 Liberty street.
Maxwell, Chas. E., of Manning & Squires, 113 Liberty street.
Mayer, Adolph, of Gretsch & Mayer, 98 Fulton street.
Mayer, Carl; Mayer, Max R.; Mayer, Simon, and Mayer, Wm., of Mayer Bros. & Co., 112 Pearl street.
Mendel, S., 117 John street.
Mercer, Geo. C., Lodi, N. J.
Merrill, Wm. Willis, 2 Stone street.
Mickerts, O., of Waltman & Mickerts, St. Louis, Mo.
Miller, Geo. M., 64 Broadway.
Miller, Manton L., 119 East 125th street.
Moelling, Chas. E., of Mayer Bros. & Co. 112 Pearl street.
Moers, E. M., Cincinnati, Ohio.
Montgomery, Jas. M., of Stroud, Sibbald & Co., 104 John street.
Moore, H. B., of N. Y. Lighterage and Trans. Co., 70 Wall street.
Mosford, H., of J. L. Mott Iron Work Co., 88 Beekman street.
Mott, Jordan L., of J. L. Mott Iron Wor Co., 88 Beekman street.
Murray, H. B., 35 Broadway.
Nesbitt, Jos., 981 Second street.
Newton, J. B., 17 Bridge street.
Nissen, Geo., 22 Burling Slip.
Olivari, Gaetano, 15 South William street, Oppenheim, Ed. C., 32 Thomas street.
Pancoast, Richard, of Pancoast & Rogers, 28 Platt street.
Parsons, John, of Bond, Parsons & Co., 104 John street.
Paulison, R. R., of Jno. E. White & Co., 221 Pearl street.
Payne, S. H., 9 Burling Slip.
Pierson, J. Fred., of Pierson & Co., 24 Broadway.
Poole, Geo. H., N. Y. Metal Exchange.
Poole, Chas. H. S., of Walker, Hopkins & Co., Detroit, Mich.
Pope, Jas. E., and Pope, Thos. J., of Thos. J. Pope & Bro., 202 Pearl street.
Raunheim, Saly, of Lewisohn Bros., 121 Greene street.
Raynor, Jas. U., 2 Stone street.
Reardon, Wm. N., of N. Y. Lighterage and Trust Co., 70 Wall street.
Reid, John, of J. L. Mott Iron Works Co., 88 Beekman street.
Reichert, Joseph, of Lewisohn Bros., 121 Greene street.
Reilly, Thos. E., 31 Moore street.
Renoue, Wm., of Mayer Bros. & Co., 112 Pearl street.
Roberts, E., of C. R. Hickox & Co., 36 Whitehall street.
Robinson, J. P., Jr., of J. P. & G. C. Robinson, 14 Coenties Slip.
Robertson, Robt., of Jas. Williamson & Co., 65 Wall street.
Ross, Wm. P., of Bechstein & Co., 100 Hudson street.
Sanneman, Jno. G., of A. A. Thomson & Co., 215 Water street.
Saville, S. L., 104 John street.
Scheel, Jno. H., of Scheel & Van Riper, 5 Front street.
Scheller, Hugo, of Ralli Bros, 13 Old Slip.
Schoonmaker, J. H.; Schoonmaker, L. H., and Schoonmaker, N. R., of Schoonmaker & Co., 111 Broad street.
Schwartz, M. M., of Lehmair, Schwartz & Co., 501 First avenue.
Shotwell, John, 57 Maiden Lane.
Shippy, H. L., 117 Liberty street.
Shriver, Edward J., New York Metal Exchange.
Sibbald, J. G., of Stroud, Sibbald & Co., 104 John street.
Sichel, A., of Lehmaier, Schwartz & Co., 501 First avenue.
Simon, Wm., 50 Carmine street.
Slocovich, G., of Slocovich & Co., 74 Broad street.
Small, Louis C., of John Boynton's Sons, 32 Broadway.
Smith, Allan C., of Henderson Bros., 7 Bowling Green.
Smith, Alfred G., of R. A. C. Smith, 69 Wall street.
Smith, Andrew J., 68 Dey street.
Smith, P. R., Denver, Col.
Smith, R. A. C., 69 Wall street.
Smith, Wm, 40 Market street.
Smith, Wm. Allen, 16 Exchange Place.
Snow, W. W., of Ramapo Car Wheel Works, Ramapo, N. Y.
Spring, Fred'k, of Fred'k Spring & Co., 124 Front street.
Stack, M. P., and Steckler, Sam'l B., of Mayer Bros. & Co., 112 Pearl street.
Stein, Julius, 197 Pearl street.
Strauss, A., of Copper Queen Mining Co., 37–39 Wall street.
Strong, Geo. L., of Hayden & Co., 68 Beekman street.
Story, Ed. A., 74 Broad street.
Stroud, E. H., and Stroud, Wm. Lawrence, of Stroud, Sibbald & Co., 104 John street.
Sturges, Theo., of Oxford Iron Co., 52 Wall street.
Suydam, J. V. M., 32 Liberty street.
Taylor, Jos. A., of Chas. Hubbard, 46 Cliff street.
Ten Broeck, R. H., of Ten Broeck & Co., 49 South street.
Thalman, Ernst, and Thalman, Karl, of Ladenburg, Thalman & Co., 50 Exchange Place.
Thompson, Jno. E., of Jno. W. Quincy & Co., 98 William street.
Thompson, R. M., of Orford Nickel and Copper Co., 39 Wall street.
Thomson, David, of D. Thomson & Co., 215 Water street.
Tilton, Wm. P., of F. L. Froment & Co., 112 John street.
Tompkins, Geo., of O. E. Schmidt & Co., 22 Burling Slip.
Trench, C. S., of E. P. White & Co., 55 Fulton street.
Trowbridge, B. A., 163 Fulton Market.
Ungrich, Henry, of G. F. Keller & Co., 90 Ninth avenue.

Van Voorhis, W. W., of Manhattan Iron Works Co , 69 Wall street.
Von Dreele, Geo. H., of Johnston Bros., 101 Pearl street.
Waeber, G. A., 55 Beaver street.
Waterman, Frank, of J. Waterman & Sons, Albany, N. Y.
Waterbury, Leander, of Waterbury & Force, 136 Front street.
Watson, John C., of J. B. Newton, 17 Bridge street.
Webb, Henry, of J. M. & Hy. Webb, 4 Stone street.
Wehncke, Ernst, of Wehncke & Co., 42 Beaver street.
Weir, Thomas, 207 West 20th street.
Wells, Wm. T., 7 Cliff street.
Wheeler, E. S., of E. S. Wheeler & Co., 54 Cliff street.
White, E. P., of E. P. White & Co., 55 Fulton Market.
White, H. W., Boston, Mass.
White, Jno. E., of John E. White & Co., 221 Pearl street.
Whitney, J. H., 32 Chambers street.
Williams, Jno. J., of John Davol & Sons, 100 John street.
Williams, Thos. H., of E. A. Williams & Sons, 107 Plymouth street, Jersey City, N. J.
Windmuller, Louis, of L. Windmuller & Roelke, 20 Reade street.
Wilks, Sam'l. A. S., of Jas. Williamson & Co., 65 Wall street.
Witherbee, Frank. S., of Witherbee, Sherman & Co., Port Henry, N. Y.
Wolf, David, of Mayer Bros. & Co., 112 Pearl street.
Wolff, Lee, of Wolff & Seligsberg, 136 Front street.
Wolff, R. H., of R. H. Wolff & Co., 93 John street.
Wood, Jno. H., 67 Liberty street.
Wood, W. H., 29 Pearl street.
Woodruff, Franklin, of F. Woodruff & Co., 45 South street.
Woodruff, T. L., of Nash & Whiton.
Woodward, Thos., Jr., 45 Water street.
Wright, Geo. H., of G. H. Wright & Co., 70 Wall street.
Yates, J. C., 13 Cotton Exchange.

The Tin-Plate Duty Discussion.

NEW YORK, June 12, 1883.

To the Editor of The Iron Age.—DEAR SIR: The official statistics for calendar year 1882 report that the total importations of "tin plate, and terne plates taggers tin" were 479,330,656 pounds, and value at Liverpool, $17,975,161, equivalent to 3¾ cents per pound, upon which $5,272,637 revenue were collected by the United States Government. The addition of freights, insurance, interest and importers' and jobbers' expenses and profits in the United States would swell the cost of these 240,000 tons to not less than $30,000,000 to American consumers. The major part of the wholesale profits upon this British "monopoly" are secured by the foreign agents and brokers, and shipping lines having offices at the principal ports on the Atlantic and Pacific, who remit proceeds back to Great Britain, probably swelling the exportation of gold in exchange to not less than $25,000,000 per annum. Besides the immense losses of business and profits to farmers, canners and artisans in every branch of productive industries, and to interior transportation companies as well, because of non-production of these so-called tin plates, &c., in the United States, the nation, therefore, is annually drained of about $25,000,000.

For the benefit of those deceived by the superficial statements of hired "revenue-only" advocates, we will as briefly as possible outline the consequences of an American production of these 240,000 tons annually, as affecting the welfare of farmers, canners, transporters, professional laborers and the people at large, and justifying—yes, demanding—the enactment of "protective duties" essential to succesful competition for the "common welfare," and in harmony with the duties protecting the manufacture of all other finished forms of steel and iron. At present the industry is prohibited by Governmental injustice and legislation to protect a foreign monopoly. To make 240,000 tons of tinned sheet iron and steel (tin plates) there would be required about 850,000 tons iron ore and 300,000 tons of limestone to produce the 300,000 tons pig iron necessary, and to make the "tin plates" from the ore would require not less than 1,500,000 tons of coal. The mining of these 2,600,000 tons of "raw materials," their transportation by wagon, railroad and steamboat to the blast furnaces, the operation of these furnaces in production of the pig iron, the transportation of this pig iron to the sheet iron or steel mills, the puddling, hammering and rolling of this iron into the sheets, the more simple processes of coating them with tin or lead and tin, and their shearing, boxing, marking and shipping, would each employ large bodies of men, forming separate communities of towns and cities numbering tens of thousands. These American operatives and their families would provide for agricultural products and for the products of other mechanics an immense additional home market difficult to estimate in figures.

An idea of its far-reaching, invigorative influence may be formed from the statement that these operatives expend their earnings, when received, almost wholly for farm products, either "raw" or manufactured therefrom. 1. Bread—the farmer's wheat. 2. Butter and milk—from the farmer's cows. 3. Mutton, beef and pork—the farmer's sheep, cows and hogs. 4. Molasses—from the planter's cane. 5. Muslin—the planter's cotton. 6. Clothes—the farmer's wool. 7. Boots and shoes—the farmer's hides. 8. Whiskey and lager beer—the farmer's rye and hops. 9. Rent, furniture, books, newspapers, pianos, &c. 10. The saving fund.

The laborers engaged in making and selling and handling these "necessaries"—millers, butchers, bakers, clothiers, shoemakers, merchants, &c., are again the farmer's customers (called "towns" and "cities"), as are also the workmen who (1) make the tools and manufacture powder for mining ore, coal, &c. (2) Those who make the railroad iron and steel, build the bridges, cars, locomotives and depots, and who produce the oil, tools, &c., used in building and running the railroads necessary to the immense carriage of these raw materials and finished products from points of production to markets. (3) The carpenters, bricklayers, plumbers, painters, draftsmen, engineers and artisans of every class engaged in building and repairing the mills, furnaces, machine shops, tool factories, &c., necessary to the production of these various agricultural and mechanical products, and (4) clerks, lawyers, conveyancers, insurance companies, ministers, professors, editors, &c., engaged in assisting, protecting, instructing and advising in the varied temporal and spiritual needs arising among many thousands of citizens in communities.

Is it not evident that of all men the farmers and dealers in farm products are chiefly benefited by mechanical activity and profitable manufacturing in the United States by this multiplication of customers, and consequently that of all men they should be the first and strongest advocates of ample protection to those desiring to make tinned iron in the United States and to manufacturing developments generally? As a direct consequence of stimulating the inventive genius of American mechanics by activities resulting from protection, creating both the necessity and opportunity for quicker and cheaper processes, American implements and agricultural machinery are cheaper than in Europe, and farmers' clothes and other manufactured goods required cost very little more than in Europe, and not as much as if they were dependent on foreign supplies. Protection enriches the farmer. We estimate within moderate limits in stating that the annual American production of 240,000 tons of tin plates, terne plates, &c., would cause in repeated transfers, as indicated, an intercirculation of not less than $300,000,000, say $30,000,000 transferred 10 times, with an average profit of 10 per cent., equaling, say $30,000,000 of income to the various classes of laborers necessarily engaged in mechanical occupations connected therewith. In fact, when produced by home labor from our own raw materials chiefly, the total cost of any manufactured article in the United States simply represents the accumulated proceeds of American labor and profits (of which farmers get more than one-half), and is just that much added to the actual wealth of the nation.

Inasmuch, therefore, as the American people would earn at least $30,000,000 per annum in returns for labor resulting from and in producing 240,000 tons of tin plates, &c., it is evident that it would be more economical to make these products in the United States, even if their final cost was double the price when imported, and that the farmers and canners would be most particularly benefited, inasmuch as it is those operatives not farmers who must and do not only buy "raw" farm products, but also the "canned goods," &c., even if advanced "3½ cents per dozen" when cooked. The nation would be annually $25,000,000 at least richer, inasmuch as the cost of the products would remain in the United States. We trust these facts will not be incomprehensible to college professors and other "toadies" and "book worms," whose mistakes appear to arise chiefly from lamentable ignorance as to simple facts of inside practice understood by ordinary clerks in mercantile and manufacturing life, all of whom at least comprehend the vital and essential necessity and advantages of home markets to everybody, and the paralyzing consequences of prices so low as to represent only the poverty and misery of the laboring classes as in Europe. There is, however, an element of selfishness and of brutal inhumanity displayed in their contemptible echoing of "Cobden Club" sophistries and plausible "clap-trap," formulated abroad to deceive the people into supporting foreign industries, while reducing American laborers to a poverty-stricken European basis, or are they Benedict Arnolds at heart and in practice traitors, betraying for British gold American industrial security as worthy of "protection" as the life and liberty of our citizens and involved as directly in their "pursuit of happiness?"

ELY & WILLIAMS.

TRADE PUBLICATIONS.

Pencoyd Iron Works.

Messrs. A. & W. P. Roberts & Co., of the Pencoyd Iron Works, of Philadelphia, Pa., have just sent us their catalogue of beams, channels, angles, tees, &c., which may be unhesitatingly pronounced one of the most carefully prepared and strikingly attractive specimens thus far received. It is furnished with a substantial cloth cover bearing the name of the firm on the outside, is 15 x 19¾ inches in size, and contains 19 plates illustrating the various sizes and types of beams and other manufactures turned out by them. Accompanying each engraving is a table giving the width of flange, thicknesses of web and weights per yard for the I beams and channels, and also the width of bulb in the case of deck beams. The thicknesses and weights per yard of angles are given in a similar way, and the sections of the various shapes thus far enumerated contain the dimensions corresponding to the minimum weights. In connection with tees the dimensions also are given, and a foot-note informs us that the weights of these sections cannot be changed. The engravings are well executed and printed on a good quality of paper, and each plate is provided with a border which, plain though it is, adds to the generally attractive character of the page. The whole work betrays a considerable amount of care in its execution, and may justly be regarded, as we have already stated, as one of the most attractive specimens of its class.

Hardware Specialties.

The Adams & Westlake Mfg. Co., of Chicago, Ill., have just issued a very beautiful catalogue of hardware specialties, including tin and brass lanterns, cuspidors, oil cans and tanks, stove boards, toilet-ware, oil stoves, student and barn lamps, water coolers, &c. This catalogue is issued in very elegant form, bound in excellent cloth covers, very freely and well illustrated. Every article mentioned is shown in a small cut, its dimensions are given and the price per dozen, with further explanation when needed. In the department devoted to toilet-ware the cuts are printed in brilliant colors, with gold and bronze where these are used in the goods shown. Considering the number of colors on a page, this color printing seems to us quite remarkable. Nineteen pages are devoted to these colored prints, which we are sure will greatly interest the trade and enable dealers to order with a view to obtaining a very showy and well-selected stock. A perspective view of the company's works at Chicago is given as a frontispiece. The indexing is very thorough, and everything about this catalogue is strictly first class.

The Rothweiler Mfg. Co.,

of 297 to 301 Saratoga street, Newport, Ky., have issued an illustrated price list of tinners' tools and machine presses, &c., which contains several specialties of more than usual interest to sheet-iron workers. Among these may be mentioned a combined squaring, splitting and trimming power shear—in other words, a power squaring shear with several valuable attachments. This tool is new, having been patented within the present year. It is adapted to cutting heavy iron, and, among others, meets the requirements of safe makers, wrought-iron range builders and general workers in heavy gauges of the sheet metals. Robinson's cornice brake is also illustrated and described, while following it are roofing tools, squaring shears, rim machines and a general line of small tools used in the tin shop. A number of punches, bench, screw and drop presses complete the book. A squaring shear of the general description above referred to, operated by power and adapted to lighter gauges of iron, with a capacity of 8 feet, is something that is in demand by cornice workers, and we should think might be made a desirable addition to the assortment of tools manufactured by this company, particularly so in the light of the improvements they have embodied in the heavier machine above mentioned.

Eleventh Cincinnati Industrial Exposition.

The rules and premium list of the Cincinnati Exposition for 1883 are at hand. The cover is, as usual, a work of art. This time it is printed in colors on a bronze ground. Printing and illustrating throughout are of the very finest description. The Exposition itself opens September 5 and closes October 6. It will be open for the reception of articles from Wednesday, August 16, to Tuesday, September 4. The usual blanks accompany the list. The rules have the unusual good feature of being short and to the point. The classification of machinery is good, and, with few exceptions, things that are similar in character or belong to similar classes are brought together. Occasionally, however, perhaps from the necessities of classification, we find the opposite to be the case. For example, dumb waiters for private houses are in the same class as compound condensing engines, and a model of a river steamboat in the same class as diving bells. These seeming anomalies, which are often found in exhibitions, are accounted for by the fact that no class can be altogether a simple one, and certain general classifications which are entirely cognate include in their ramifications articles which, when brought together, seem utterly adverse and without relationship. There are in the list before us 1458 premiums, which ought to be sufficient to give every exhibitor who has a deserving article a fair chance for a premium of some sort. Of the building and its arrangements, the maps and plans give a most complete idea. In its way the catalogue is a model, and might be imitated with advantage by others of its class.

Catalogue of Surveying and Mathematical Instruments.

Among the many elaborate catalogues of mathematical and artistic instruments published in this country, a price catalogue of surveying and mathematical instruments and drawing materials, published by F. W. Devoe & Co., of New York, and containing some 264 pages, we think is the largest, most complete and most sumptuous that has yet been attempted. It embraces almost every variety of goods used by engineers, draftsmen, architects and surveyors, contains a fine list of publications, and is profusely illustrated in every department. The characteristic American feature of minute, intelligent and accurate descriptions of the goods is carried out in every department, and any one who has the least familiarity with the goods can order by number with a feeling of certainty that the goods received will be exactly what are wanted. The firm include in this catalogue a variety of articles not usually found in such lists. Among these we note a variety of ruling and lithographic implements, new form of light Swiss instruments, elaborate pantographs and ellipsographs, several more expensive kinds of protractors, and a variety of instruments of precision, including transits, leveling instruments, plane tables, astronomical telescopes, small astronomical transits and zenith instruments, theodolites and other things of the same character. The work is a very valuable contribution to the literature of its class.

Bolts and Coach Screws.

An attractive little catalogue relating to bolts, coach screws, &c., has just been sent us by Messrs. Plumb, Burdict & Barnard, of Buffalo, N. Y. It embraces 46 pages, profusely illustrated with engravings of the different articles turned out by the firm, and accompanied by such further particulars as price lists, dimensions, &c., that are of importance to purchasers. Messrs. Plumb, Burdict & Barnard further inform the reader that the illustrations submitted do not cover all their patterns, but simply the leading or more important lines, and that all additional information will be readily given upon application.

The Mekarski system for driving railway cars by compressed air has been adopted by one of the London (England) street railroads. A recent trial trip is said to have given satisfactory results, and all the cars of the company are to be gradually fitted up with reservoirs for compressed air and motors.

It is reported, on what is deemed "good authority," that a company has been organized in this city for the purpose of laying two new ocean cables between this country and Europe.

The Enterprise Meat Chopper.

The Enterprise Mfg. Co., of Philadelphia, are introducing to the trade their new Enterprise meat chopper. In the accompanying illustrations Fig. 1 shows the general appearance of the machine in operation, and Fig. 2 represents its different parts, which are few and simple. The hopper and cylinder are combined, the latter containing the screw which carries the meat forward. A four-bladed knife is attached to the end of the screw, and revolves with it as the crank is turned. A plate perforated with numerous small holes fits into the end of the cylinder, and is secured in position by a ring which screws up and clamps the plate tightly against the knife. The meat is fed into the hopper and carried forward by the screw until it reaches the perforated plate, when the pressure forces it through the small holes of the plate, where it is chopped off by the revolving knife, which makes four cuts for each hole with every revolution of the crank, the small pieces thus cut being forced out by the continuous pressure from the interior of the cylinder. The blades are self-sharpening. This machine is also adapted to other purposes which will make it useful the year round to butchers, farmers, hotels, &c. The

Fig. 1.—The Enterprise Meat Chopper.

capacity of No. 10 is one pound of meat per minute; of No. 32, three pounds per minute; of No. 42, four pounds per minute; this last is used for chopping pork only.

Swiss Domestic Industries.—According to the latest statistical returns of the Swiss Federal Trade Department, there are at present in Switzerland 1256 factories engaged in the cotton industry, and giving employment to 54,115 operatives; 228 silk mills, employing 25,866 operatives; 102 chemical works, with 2749 employees; 48 metallurgical works, with 2158 employees; 212 machine works, with 14,271 employees, and 93 horological and jewelry works, employing 8558 persons. The total number of works under the Factory act is 2642, and the total number of employees therein 134,862, consisting of 70,364 males and 64,498 females, 10,462 being between the ages of 14 and 16 years.

The strike of ship laborers in Montreal for double wages in yards using steam cranes appears to be a revival of the old battle that

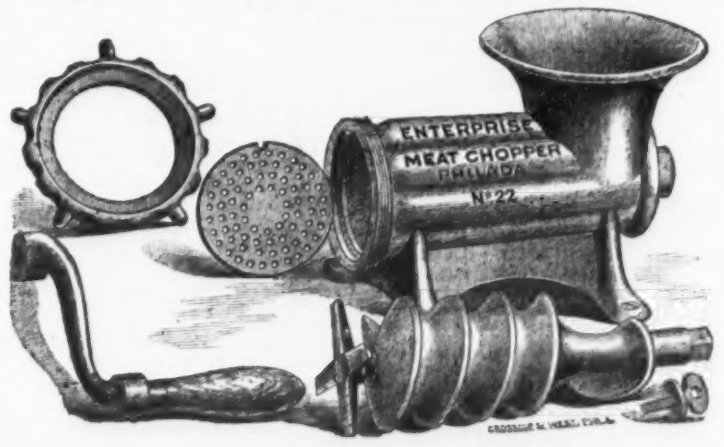

Fig. 2.—Construction and Working Parts.

was fought out in England more than a generation ago against the introduction of machine tools. Individual workmen, no doubt, suffered, temporarily at least, from the substitution of machine work for hand labor, and some were compelled to learn new trades, but the general effect has been to improve the condition of workmen in mass. It can safely be predicted that if it comes to an issue between steam cranes and laborers in the ship-yards of Montreal, the steam cranes will win.

How to propel trains in tunnels is one of the mechanical or engineering problems of the day for which no very successful answer has yet been found. Ventilation even in short tunnels is exceedingly bad, and in our climate the products of combustion make the air almost stifling in certain conditions of the weather. Any method of storing power which would not occupy more space or weight than an engine and boilers, and would be able to run for 8 or 10 hours continuously, would be one of the most valuable inventions of the age. Even the storage battery, which entails a loss of at least 50 per cent., could be made immensely useful if it were possible to charge the battery repeatedly without injury to it.

The steam barge D. C. Whitney, the largest craft that ever passed through the new Welland Canal, arrived at Kingston the other day. She had her consort, the Wayne, in tow, and both crafts had a combined cargo of 110,000 bushels of corn. The D. C. Whitney drew 14 feet 7 inches of water forward, and had to be lightened of 24,000 bushels at Port Dalhousie, which was again reloaded after passing through the canal, and the entire cargo delivered at Kingston in good condition. The Whitney is 256 feet long, 41 feet beam, and 15 feet depth of hold. She was built in Detroit last year. The present is her first trip this season, and it has been a profitable one, her freight bill amounting to $6500. She is strongly built, the better to qualify her for the trade in lumber, at which it is calculated she can carry 1,200,000 feet.

Boiler and Ship Plates.—Basic steel plates made in the Bessemer converter by the Thomas-Gilchrist process at Witkowitz, in Moravia, were recently sent to the Austrian Lloyd's Registry, at the request of that authority, to be tested as to their suitability for boiler-making and shipbuilding purposes, and, when they had been exhaustively tried, they were pronounced to have stood very satisfactorily all the tests required by the Lloyd's committee. Authentic returns of the production of basic steel by the 17 firms who are making it show that the annual output is at the rate of 558,800 tons. In the six months ending with March the precise tonnage was 279,400. It was made to the extent of 57,911 tons by the one firm in England, 5962 tons by the two firms in France, 12,786 tons by one firm in Belgium, 152,479 tons by the nine firms in Germany, 37,476 tons by the three firms in Austria, and 12,786 tons by the one firm in Russia. The make by Messrs. Bolckow, Vaughan & Co.—the one English firm at present working a basic plant—is, it will be seen, at the rate of 9651 tons per month. This is considerably over three times the average made per month by individual German firms, and the German firms, the foregoing returns show, are not only the largest producers of this class of steel in the aggregate, but also the largest producers, per individual firm, of all the Continental firms who have adopted the system.

California proposes to send an enormous quantity of wheat to market this season. The San Francisco *Journal of Commerce* says that two months ago the harvest seemed dead, but now the wheat yield is enormous, compared with all previous experience. It says: "It must be remembered that only a few years have elapsed since 30,000,000 bushels would have seemed a mighty yield; now we confidently look forward to more than double that figure. Year after year more of our fertile acres have been subjected to the yoke of the plow, until this year we have as much under wheat as has Great Britain and Ireland, with 32 times our population. This is something to be proud of. Our wheat will sell for $100,000,000; our barley for $15,000,000; our hops for $150,000; our wine for $4,000,000; our wool clip for $9,000,000; our fruit crop will pour into the lap of the grower $5,000,000; our dairy produce will bring $9,000,000; minor cereals, $5,000,000 to $6,000,000—a grand total of nearly $150,000,000 from a portion of our farm produce alone. With $150,000,000 to spend, or about $1000 for every man, woman and child of our farming population, our trade in the year, so auspiciously begun, will be in a measure marvelous." The San Francisco *Commercial Herald* supplements this with the statement that the "vastly improved crop reports are stimulating exporters to increased activity in preparing for the removal thereof in the fall months, while the great decline in wheat for both spot and futures adds a fire to the flame. The disengaged fleet in port aggregates 50,000 tons, against 33,000 tons one year ago. There is on the berth 23,000 tons, which is about the same as it was a year ago. The fleet to arrive within five or six months is 241,000 tons."

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Burgh.—Practical Rules for the Proportions of Engines and Boilers, for Land and Marine Purposes. By N. P. Burgh; new edition, 219 pages, 12mo, cloth. London, 1878 . . . . . $1.50

This collection of rules will prove of practical value to the designer of any class of steam engines. All the details are carefully worked out and explained. The work includes the subject of toothed wheels (gearing).

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The engine designer will find this an instructive work, in that it will enable him to calculate with certainty not only sizes and strengths with present materials, speeds and pressures, but also to use other materials or pressures and still be able to be sure of his results. Portions of the mathematics are difficult, but aside from this fact the book contains much valuable matter, and is one of the best works on American practice that has ever been issued.

King.—Notes on Steam. By the late W. R. King, U. S. N.; revised by Chief-Engineer J. W. King, U. S. N.; 19th edition, enlarged, illustrated, 229 pages, 8vo, cloth; 1882 . . . . . $2

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1 " " 14 in. x 6 ft. Star Tool Co. New.
1 " " 18 in. x 6 ft. New.
1 " " 14 in. x 5 x 6 ft. New.
1 " " 16 in. x 7 ft. Bridgeport. New.
1 " " 13 in. x 5 ft. and 6 ft. Ames. New.
1 " " 16 in. x 6, 7 and 8 ft. Ames. New.
1 " " 18 in. x 8 and 10 ft. Lodge & Barker. New
1 " " 27 in. x 10 in. Lodge & Barker
1 " " 22 in. x 12 ft. New.
1 " " 20 in. x 10 ft. New.
1 " " 28 in. x 16 ft. New.
1 " " 24 in. x 12, 14 and 16 ft. New.
1 " " 11 in. x 4 ft. and 5 ft. Prentiss. New
1 " " 13 in. x 5 ft. Young. New.
1 Plain Engine Lathe, 16 in. x 4 ft. New.
1 " " " 15 in. x 4 ft. New.
1 Fox Lathe, 15 in. x 5 ft, Am. Tool & Machine Co.
1 15 in. x 4 ft. Turret Lathe. Lodge & Barker.
1 Fox Turret Lathe, 16 in. x 6 ft. Lodge & Barker. New
1 Planer, 50 in. x 50 in. x 17 ft. Good order.
1 " 32 in. x 32 in. x 7 ft. Good order.
1 " 16 in. x 16 in. x 3 ft. New.
1 " 22 in. x 20 in. x 5 ft. New.
1 " 24 in. x 24 in. x 6 ft. Hendey. New
1 " 36 in. x 36 in. x 7 ft. New.
1 " 16 in. Lever Table Drill. New.
1 Crank Planer, 16 in. x 16 in. x 13 in. New.
1 16-in. Upright Drill. New.
1 20-in. " Prentiss. New.
1 24-in. " Prentiss. New.
1 30 in. " Prentiss. New.
1 25-in. swing B. G. & S. F. Drill. Blaisdell. New
1 28-in. " " " " "
1 38 in. swing, B. G. & T. F. Drill. New.
1 15-in. Shaper. Gould & Eberhardt. New.
1 10-in. Shaper. Gould & Eberhardt. New.
1 15-in. Shaper. Hendey. New.
1 24 in. Shaper. Hendey. New
1 24-in. Shaper. Hendey. Good order.
1 9-in. Shaper. Hewes & Phillips. New.
1 9-in. Shaper. New.
1 14-in. Shaper.
Full Assortment of Milling Machines, Spindle Drills, &c., of Garvin's. New. & Lamson.
1 each Nos. 2 and 4 Screw Machines, Wire Feed. Jones
2 No. 2 Lincoln Millers. Good order.
2 No. 2 Lincoln Millers. New.
1 Hand Lathe, 12 x 4, 4 and 6 ft. New.
1 Hand Lathe, 16 in. x 6 and 7 ft. New.
1 Boring and Turning Mill, 50 in. New.
1 Boring and Turning Mill, 72 in., 2 Heads. New.
1 each 3 and 7 spindle Nut Tappers. New.
1 Gig Saw. Good as new. Rogers.
1 700-lb. Steam Hammer. Ferris & Miles. Good order

New York Agency of
THE TANITE CO. and GRANT & BOGERT MACHIN TOOL WORKS.

H. PRENTISS & CO., 42 Dey St., N.Y

For Sale.

Established 2873. Gardner Bros "Standard Savage" Fire Brick Works, situated at Ellerslie Station, Md., on Baltimore and Ohio R. R. Also on Bedford Branch of P. R. R. Has convenient shipping arrangements on both roads. Works consist of two independent plants of machinery, so constructed and arranged that they can be run separately or together. One of the buildings entirely new, erected last year. Capacity of works, over 14,000 bricks per day. Mount Savage clay in abundance, mined on royalty, and delivered direct into works by gravity. Inclined plane and tram road, large portion of which was laid with new Tee rail last year. New artesian well, capacity over 35 barrels per hour. Also mountain stream, delivering water by gravity into tanks at works. Seven acres of land, with nine good tenements. Everything in first-class order for manufacturing and shipping brick direct from kilns into cars. Good and growing trade established. Brick unquestionably as good as the best made of Mount Savage clay. Statements of business done will be shown to responsible parties desirous of purchasing. Our good will and influence to go with sale. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

For Sale.

Established in 1864. Gardner Bros.' Gas Retort and Fire Brick Works, situated at Lockport Station, on P. R. R., 60 miles from Pittsburgh, Pa. The works consist of complete plant for manufacturing Clay Gas Retorts, Settings, Blocks, Tile and Fire Brick. Capacity, about 100 retorts, with necessary settings, and 100,000 fire brick per month. Clay and coal mined by ourselves within short distance of works and hauled in wagons. Over three acres of land, with all necessary buildings, a number of tenements and town lots. P. R. R. has side track alongside our kilns. Good trade established. Our good will and influence to go with sale. Statement of business done will be shown to responsible parties desirous of purchasing. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

FOR SALE.

One Cast Iron Vacuum Pan. Vacuum and water pumps and all attachments.
One Granulator, with attachments.
One large Mixer, with attachments.
One No. 5 Vacuum Pump.
Two Sugar Packers.
Two Agitating Engines.
Two Steam Engines.
Nine Char. Filters.
Two Scum Presses.

The above is a portion of the Machinery formerly used at Baltimore Steam Sugar Refinery, Baltimore, Md. For information apply to GEO. B GRAHAM, P. O. Box 193, Baltimore, Md., or to F. E. ADAM, n. e. cor. Lombard and Concord sts., Baltimore.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. Easy terms of payment are offered to suit a purchaser of limited capital. For list of Tools and further particulars apply to

WM. McILVAIN & SONS,
Manufacturers of Boiler Plate and Tank Iron,
Reading, Pa.

For Sale.

Heavy Planer, 39 in. x 39 in. x 13 ft., with rack extension, to plane 20 ft. Good as new.
24 in. to 36 in. planers.
15 in. column drills.
12 in. to 36 in. lathes.
Lever Shears to cut 2 x 2.
Lever Shears to trim ½ plate.

A. G. BROOKS & WINEBRENER,
261 N. 3d St., Philadelphia.

FOR SALE.

No. 6 Baker Blower, Nos. 4 and 6 Sturtevant Blower, No. 6 McKinzie Blower; Cupola, 48 inches; Crane, 15 tons; 2, 4, 6 and 10 H.-P. Baxter Engines; Planer, 20 x 16 x 4 ft., $250; do., old style, 29 x 29 x 5, $200; Engine Lathe, 30 in. x 14 ft., $350, &c.

Purchases of new and second-hand machinery carefully made, at low rates, for parties out of the city.

C. R. BIGELOW, M. E.,
18 New Church St., New York City.

For Sale.

Stock of General Hardware, Stoves and Tinware, and good-will of the business without bonus. Stock will inventory thirteen to fifteen thousand. Business located in a growing town of about 9000 inhabitants, in Northwestern Pennsylvania, and a railroad center. For further information, address

"G. T."
Office of *The Iron Age*, 83 Reade St., New York.

Trade Report.

BRITISH IRON AND METAL MARKETS.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, June 20, 1883.

Scotch Pig.—The market continues weak and depressed. Makers' prices are as follows:

Coltness,	alongside,	Glasgow	60/
Langloan,	"	"	60/6
Gartsherrie,	"	"	57/6
Summerlee,	"	"	58/
Carnbroe,	"	"	54/6
Glengarnock,	"	Ardrossan	54/6
Eglinton,	"	"	48/6
Dalmellington,	"	"	48/6
Shotts,	"	at Leith	60/6

Lighterage from Ardrossan to Glasgow is 1/ ton.

Cleveland Pig.—The market is a little firmer. We quote as follows, f.o.b. shipping ports:

Middlesboro'	No. 1 Foundry	43/6
"	No. 2 "	42/6
"	No. 3 "	39/ @ 40/
"	No. 4 Forge	38/6

Bessemer Pig—Nominal. We quote W. C. Hematites 50/ @ 51/ for mixed lots Nos. 1, 2 and 3, equal parts, f.o.b. shipping ports.

Blooms.—Nothing doing.

Manufactured Iron.—The market is quiet. We quote at works, nominally:

		£	s.	d.	£	s.	d.
Staff.	Ord. Marked Bars	7	10	0 @			
"	Medium "	6	10	0 @	7	0	0
"	Common "	6	0	0 @	6	10	0
Hoops, 20 W. G. and over.							
"	Common Best	7	5	0 @	7	15	0
"	Medium	6	10	0 @	6	15	0
"	Common	6	5	0 @	6	10	0
Sheets, 20 W. G. and under.							
"	Ordinary Best	9	10	0 @	10	10	0
"	Common	7	10	0 @	8	0	0
Welsh Bars		5	10	0 @	5	12	6

Steel Rails—Are steady. We quote Ordinary Sections £4. 15/ @ £5, f.o.b. shipping ports.

Iron Rails—Dull and nominal. Welsh, 30 lb and upward, are quoted, nominally, £4. 15/ £5. 10/, f.o.b. shipping ports.

Old Rails.—The market is a little steadier. We quote Old D. H.'s, c.i.f. New York, £3. 12/6 @ £3. 15/.

Scrap.—The market is quiet and unchanged. We quote Heavy Wrought £3. 2/6 @ £3. 5/, c.i.f. New York. Bessemer Crop Ends are quoted 60/ @ 62/, f.o.b. shipping ports, for run of the mill.

Copper—Is a little weaker. Best Selected quoted £68. 10/ @ £69. 10/, and Chili Bars, £63. 10/ @ £64.

Tin.—The market continues irregular. We quote Straits Tin, Ingot, £93. 15/ @ £94. 5/, and futures, £94. 15/ @ £95. 5/.

Tin Plates.—The market is steady. We quote:

Tin Plates, 10 x 14,	1st qual.	Charcoal	19/6 @	20/6
" "	2d "	"	18/6 @	19/
" "	1st "	Coke	17/6 @	18/
" "	2d "	"	16/ @	16/6

Spelter—Is a little weaker. Ordinary is quoted £14. 17/6 @ £15. 2/6 at shipping ports.

Lead—Is a little firmer. We quote Common English Pig £13 @ £13. 5/.

Freights.—Steam from Glasgow to New York, 6/; Liverpool to New York, 6/ @ 8/; Liverpool to Philadelphia, 7/6 @ 8/, and London to New York, 7/6 @ 9/6.

FINANCIAL.

Office of THE IRON AGE,
WEDNESDAY EVENING, June 20, 1883.

Money continues abundant and easy, with few new features to disturb the general situation. General business, it is conceded on all hands, is being conducted on conservative principles, and there is more than ever apparent a disposition to await developments. Aside from the operation of the new tariff, which to some extent remains conjectural, the outcome of the recent collapse at Chicago of the bull speculation in lard and grain will be watched with more than passing interest. Should an end be put to the abnormally high prices lately demanded for our agricultural products, thereby removing the check to free exportation, a favorable balance of exchange will once more be established, and the uncertain future of our foreign trade no longer crowd itself into mercantile calculations. The event of the week most closely affecting financial circles is a break in prices among the leading speculators in provisions and other staple products who make their headquarters at Chicago. The general markets in New York and throughout the country are more or less affected in sympathy, but thus far without consequences calling for expressions of regret. On our Produce Exchange excitement has run high, attended with large transactions at declining prices. The first intimation of trouble was the failure of Peter Geoch & Co., leading operators, followed on Tuesday by M. S. Nichols & Co., the largest wheat commission firm in Chicago, and this caused the suspension of R. H. Parks & Co., of this city, who have considerable dealings on the Stock Exchange. Increasing receipts of grain, together with favorable crop advices and lower foreign markets, contributed to the demoralization, but the effects were limited to a comparatively narrow circle. One consequence is to transfer from speculative hands to legitimate trade circles large quantities of provisions and grain which are already moving off for actual consumption. Exporters are buying rather more freely at the decline. The continued lifeless condition of the foreign market, with the exception noted, is now a feature of leading interest, the question being whether England and the Continent are not so far overweighted as to materially limit the demand.

The buoyancy on the Stock Exchange noticed one week ago culminated on Friday, when an attack was made upon New Jersey Central and Reading, based upon a report that the Pennsylvania had secured control of the Lehigh Valley. On Saturday the bears took advantage of the heavy failures in Chicago, but the effect intended was in part neutralized by anticipation of a renewed export movement in agricultural products, which lower prices would be likely to stimulate. On Monday the market was weak and unsettled by reports concerning the financial standing of Western houses, and prices were generally lower. On Tuesday afternoon the failure of a firm of grain brokers having Western connections was the signal for renewed bear attacks, the market closing feverish and irregular. Today the stock market was irregular and excited, in consequence of rumored additional failures in Chicago, and the break in prices ranged as high as 2⅛ %; but there was a partial recovery toward the close. The later dealings were in Lackawanna at 127⅞, 127⅛, 127½; Jersey Central at 86⅛, 84, 85¼, 84¼, 85⅛; Reading at 57⅜, 56⅝, 57¼; Western Union at 86¼, 85⅝, 86⅛; Lake Shore at 110¾, 109¾, 110¼; St. Paul at 104⅝, 103½, 104; Union Pacific at 94½, 94, 94⅜; Louisville and Nashville at 51¾, 50¾, 51¼; Erie at 37½, 37, 37¼; Central Pacific, 75⅛, 74⅜, 74⅞; New York Central at 119¾, 119¼, 119¾; Kansas and Texas, 30⅝, 30¼, 30½; Oregon and Transcontinental at 85⅛, 84⅞, 85¼; Wabash at 30¼, 29½, 29¾. The announcement was made from the Stock Exchange this afternoon that Mr. R. H. Parks was able to pay all indebtedness in full.

Sterling is weak at $4.85½ for 60-day and $4.89 for sight, to which point bankers have reduced their posted rates. Fears of gold exports are now dismissed.

Dividend notices of banks and other corporations point to a large disbursement of funds a fortnight hence.

The exports of domestic produce from the port during the past week were of fair proportions. The shipments of breadstuffs exhibit an increase, particularly the item of flour. The movement of petroleum is good, but of cotton it is light. The shipments of provisions are about as usual, showing but little increase. The imports of foreign merchandise at this port during the past week were quite heavy, exhibiting a decided increase, compared with the totals for some weeks previous. The bank clearing-house returns for the past week afford a favorable exhibit, nearly all the principal cities reporting gains, excepting New York, where the decline is heavy, compared with last year. A gain of 25 % at Chicago is caused by a shifting of loans. *Bradstreet's* reports 165 failures in the United States during the past week—17 more than the preceding week, 61 more than the corresponding week last year, and 105 more than the same week of 1881.

United States bonds were steady, closing as follows:

	Bid.	Asked.
U. S. 5's, 1881, continued at 3½	101⅜	—
U. S. 4½'s, 1891, registered	112¾	113
U. S. 4½'s, 1891, coupon	112¾	113
U. S. 4's, 1907, registered	118⅞	119⅛
U. S. 4's, 1907, coupon	119⅞	120
U. S. 3 per cents	101⅞	104
U. S. Currency 6's, 1895	127	—
U. S. Currency 6's, 1896	128	—
U. S. Currency 6's, 1897	129	—
U. S. Currency 6's, 1898	130	—
U. S. Currency 6's, 1899	131	—

State bonds are dull and neglected.

The bank return for the week shows a decrease of $278,125 in surplus reserve, which now stands at $8,791,050, against $8,637,400 at the same time last year and $8,008,400 at the corresponding date in 1881. The following is an analysis of the bank totals of this week, compared with that of last week:

	June 9.	June 16.	Comparisons.	
Loans	$321,136,600	$321,748,500	Inc.	$611,500
Specie	61,550,000	62,209,800	Inc.	718,200
Legal tenders	26,341,000	25,943,800	Dec.	397,200
Total reserve	87,891,900	88,213,600	Inc.	321,700
Deposits	315,290,900	317,690,200	Inc.	2,199,300
Reserve required	78,822,725	79,422,550	Inc.	599,825
Surplus reserve	9,069,175	8,791,050	Dec.	278,125
Circulation	15,941,800	15,802,400	Dec.	139,400

According to the Custom House reports, the importations of specie and bullion at this port during the week ending June 15 were $49,143, consisting of $15,299 in gold and $33,843 in silver, as against a total of $73,893 for the week ending June 17 last year. The importations since the 1st of January compare as follows with the movement during the corresponding period last year:

	Since January 1— 1883.	1882.
Gold	$4,769,765	$554,120
Silver	2,018,460	1,309,775
Total	$6,788,225	$1,863,895

MINING STOCKS.

The closing quotations for mining stocks were as follows:

	Bid.	Asked.
Amie	16	18
Alice	2.50	2.90
Alta. Mont	2	4
Belle Isle	40	....
Bodie	95	1.10
B. H. & E. n'w	3/8	....
Bulwer	70	....
Bradshaw	25	35
Caled'a B H	75	....
Chrysolite	1.15	....
Central Ariz	27	....
Durango	7	....
Decatur	3	5
Eureka Con	4.00	....
East. Or	40	....
Elko Con	17	....
Findley	8	....
Father de Smet	....	4.05

Gr'n Mtn	71	....
Gold Stripe	7	....
Horn Silver	6⅜	6¾
Harlem	....	1.45
Hibernia	4	5
Hortense	9	....
Independence	55	....
Iron Silver	2.90	....
Lacrosse	....	12
Leadville Con	....	60
L. Chief	61	....
Navajo	2.00	....
N. Standard	10	....
N. Belle	6⅜	7
Rappahannock	7	9
Robinson Con	....	65
Red Elephant	5	....
Sierra G	1 15	....
Sutro Tun	22	....
Stormont	....	45

GENERAL HARDWARE.

Trade continues quiet, as may be expected at this season of the year. There seems to be little anticipation of important changes in prices for next season. The feeling prevails that as a general thing prices are low enough, and that many declines are not likely, while no one seems to think this the time to make advances.

The scarcity of Nails continues, and, as the demand is still large, the price remains very firm at $3, from which it would be difficult to get any considerable concession, even for the most desirable order. The whole country, apparently, is bare of Nails, and prices will probably rule high for some time.

The Lock manufacturers held a meeting last week in New Haven, at which they adopted a number of changes in list prices, and made the discount 50 and 2 per cent. instead of 45 and 2 per cent. formerly, all taking effect on the 14th inst. The following are the changes in the list prices of the Russell & Erwin Mfg. Co.:

No. of Lock.	Page of '82 List.	Price per doz.	No. of Lock.	Page of '82 List.	Price per doz.
0	64	$3.75	675	107	$36.00
0½	64	5.25	676	107	30.00
0¾	64	8.50	077	107	44.00
1	64	10.25	678	107	50.00
1½	64	11.50	778	106	21.00
R013	73	29.15	781	106	7.00
R013½	73	33.65	790	108	56.00
R013¾	73	38.15	790½	111	60.00
22	113	3.50	790¾	111	60.00
40	113	1.50	791	109	65.00
42	113	6.00	792	109	30.00
42½	113	7.50	850	2	4.00
44½	113	9.00	850½	3	4.15
R044½	114	12.00	851	2	5.50
45	117	13.50	851½	3	5.65
46	117	35.00	1193	43	37.50
46½	115	50.00	1194	43	45.00
47	117	25.00	1199	44	45.00
60	113	3.50	1200	44	50.00
61	113	4.50	1250	44	62.00
71	105	7.00	1251	44	71.00
072	106	5.00	1301	76	7.75
072½	106	6.00	1301½	75	7.00
73	105	12.50	1302	76	9.25
073	106	12.50	1302½	75	8.50
073½	106	14.50	1303	76	11.00
073¾	106	16.50	1303½	75	10.25
74	105	5.25	1304	76	12.25
76	105	18.00	1304½	75	11.50
77	105	16.00	1386	78	12.00
78	105	21.00	1387	78	14.00
79	105	13.00	1388	78	15.50
80	105	5.50	1389	78	18.00
81	105	7.00	1394	78	21.00
194	120	51.50	1552	36	5.50
194½	121	36.50	1552½	36	7.50
195	120	56.00	2456	51	24.00
195½	121	41.00	2457	51	27.00
R198	120½	51.50	2470	53	57.00
R198½	120½	36.50	2490	52	24.00
250½	22	4.40	2491	52	27.00
251½	22	5.90	2492	52	30.00
253	45	68.00	8241½	28	13.50
300	68	5.00	8246	29	15.00
301	68	7.00	8552	36	7.00
302	68	8.50	8607	33	10.00
303	68	10.25	8607½	33	13.00
304	68	11.50	8607¾	33	16.00
340	65	3.75	8801	14	16.00
341	65	5.25	8802	14	19.00
495	55	60.00	8821	15	17.50
551	35	4.25	8822	15	21.25
0551	35	3.25	8861	14	12.00
551½	35	5.75	8862	14	14.25
552	35	5.50	8866	15	13.00
0552	35	3.75	8867	15	17.00
552½	35	7.50	060	114	3.90

Door Knobs, Pages 155 to 161.

Nos.	Per doz.	Nos.	Per doz.	Nos.	Per doz.
415	$2.50	8801	$5.00	9701	$7.00
8030	11.00	8850	5.00	9800	5.00
8700	5.00	8851	6.00	9801	6.00
8701	6.00	9030	12.50	9850	6.00
8800	4.00	9700	6.00	9851	7.00

Closet Knobs, Page 163.

Nos.	Per doz.	Nos.	Per doz.	Nos.	Per doz.
415	$2.50	8850	$5.00	9800	$5.00
8700	5.00	8851	6.00	9801	6.00
8701	6.00	9700	6.00	9850	6.00
8800	4.00	9701	7.00	9851	7.00
8801	5.00				

Bell Pulls, Pages 183 and 184.

Nos.	Per doz.	Nos.	Per doz.	Nos.	Per doz.
99	$10.00	8700	6.00	9700	$6.75
100	10.00	8800	5.00	9800	5.50
101	9.00	8850	6.00	9850	6.75
102	9.00				

Real Bronze Locks, Knobs and Escutcheons, discount 33⅓ per cent.

The following are the changes in the list prices of Mallory, Wheeler & Co.:

No.	Price per doz.	No.	Price per doz.	No.	Price per doz.
0	$1.50	0111	$5.00	405½	$10.00
001	4.15	00111	5.00	412	11.50
001⅜	4.00	0111½	5.50	415, 1 k	32.25
001½	5.65	0111¾	7.00	415, 2 k	37.50
001⅝	5.50	112	5.00	415½, 1 k	24.75
16, 1 k	32.25	0112	5.25	415½, 2 k	30.00
16, 2 k	37.50	112½	6.00	415¾, 1 k	18.75
18	57.00	113	9.00	415¾, 2 k	24.00
23	4.25	0113, 1 k	6.00	416, 1 k	32.25
23½	5.75	0113, 2 k	9.00	416, 2 k	37.50
25	5.50	0114, 1 k	8.00	416½, 1 k	24.75
25½	7.50	0114, 2 k	11.00	416½, 2 k	30.00
26	35.00	0115, 1 k	10.00	416¾, 1 k	18.75
27	50.00	0115, 2 k	13.00	416¾, 2 k	24.00
28	25.00	116	12.00	418	57.00
29	40.00	0116, 1 k	12.00	421	57.00
30	40.00	0116, 2 k	15.00	447*	4.50
30½	40.00	0117, 1 k	9.00	448*	4.50
31	60.00	0117, 2 k	12.00	0448*	4.50
31½	60.00	0118, 1 k	11.00	449	7.25
32, 1 k	27.00	0118, 2 k	14.00	450	7.25
32, 2 k	30.00	0119, 1 k	13.00	466, 1 k	24.75
32½, 1 k	27.00	0119, 2 k	16.00	466, 2 k	30.00
32½, 2 k	30.00	126½	8.75	466½, 1 k	21.75
33, 1 k	47.00	127½	14.25	466½, 2 k	27.00
33, 2 k	50.00	166, 1 k	24.75	468, 1 k	18.75
33½, 1 k	47.00	166, 2 k	30.00	468, 2 k	24.00
33½, 2 k	50.00	168, 1 k	18.75	555	49.50
55	62.00	168, 2 k	24.00	555½	47.00
66½, 1 k	14.50	182	6.85	555¾	45.00
66½, 2 k	17.50	184	9.00	556	42.00
67, 1 k	16.50	194	5.75	556½	39.50
67, 2 k	19.50	196	7.50	556¾	37.50
98	9.00	201	3.25	563	11.50
99	3.50	202	4.25	0579	5.00
100	13.50	203	3.75	00579	3.75
101	6.00	204	5.50	0581	8.50
102	8.25	205	3.25	X0581	8.50
103	3.50	207	3.75	0581½	9.25
105	4.50	00239½	4.40	0583	7.00
105½	6.00	00217½	5.90	X0583	7.00
108	13.50	402	[illegible]	00583	5.25
109	7.50	402½	10.00	0583½	7.75
110	12.50	403½	10.00	0584	10.25
111	7.50	404	9.00	X0584	10.25

No.	Price per doz.	No.	Price per doz.	No.	Price per doz.
0584½	$11.00	1063, 2 k	$15.50	1947, 2 k	$22.75
0587	11.50	1064, 1 k	14.50	1997	17.50
X0587	11.50	1064, 2 k	17.50	1998	22.00
0587½	12.25	1065, 1 k	16.50	1999	19.00
771, 1 k	36.75	1065, 2 k	19.50	2000	25.00
771, 2 k	42.00	1223½	13.00	2010	4.00
772, 1 k	40.75	1402	56.40	2011	5.00
772, 2 k	46.00	1402½	39.95	2012	4.00
782, 1 k	47.25	1403	60.90	2013	5.00
782, 2 k	52.50	1403½	44.45	2014	5.00
783, 1 k	54.75	1407	48.90	2015	6.00
783, 2 k	60.00	1407½	32.45	2016	5.00
900	42.00	1408	53.40	2017	6.00
900½	29.00	1408½	36.95	2018	5.00
901	46.00	1409	9.25	2020	5.00
901½	32.00	1463, 1 k	16.40	2022	6.00
902	50.00	1463, 2 k	19.40	2024	6.00
902½	35.00	1464, 1 k	18.40	2026	13.50
903	54.50	1464, 2 k	21.40	2027	12.00
903½	39.50	1465, 1 k	20.40	2050	5.75
907	42.50	1465, 2 k	23.40	2051	7.00
907½	27.50	1915	48.00	2052	7.25
908	47.00	1915½	33.50	2053	9.00
908½	32.00	1916	44.25	2061	5.00
910	50.00	1916½	31.25	2061½	6.00
911	54.50	1935	16.00	2062	6.00
1053	45.00	1936	19.75	2400	5.25
1054	51.00	1937	18.25	2401	7.25
1055	55.50	1938	23.50	2402	8.00
1056	50.00	1942, 1 k	[illegible]	2403	8.75
1057	56.00	1942, 2 k	13.75	2404	9.50
1058	62.00	1943, 1 k	13.00	2405	10.50
1059	71.00	1943, 2 k	16.75	2406	11.25
1060, 1 k	11.00	1944, 1 k	16.00	2407	11.75
1060, 2 k	14.00	1944, 2 k	19.75	2408	12.50
1061, 1 k	13.00	1945, 1 k	13.00	1917	52.50
1061, 2 k	16.00	1945, 2 k	16.75	1917½	38.00
1062, 1 k	15.00	1946, 1 k	16.00	1918	48.75
1062, 2 k	18.00	1946, 2 k	19.75	1918½	35.75
1063, 1 k	12.50	1947, 1 k	19.00		

Graham & Haines, Eastern agents for Jacob Haish & Co., have made a reduction of 1¼ cents per pound on the Haish "S" Barb Steel Fence Wire, to take effect on the 25th inst., after which date the prices and terms to dealers will be as follows:

In quantities less than 10 tons, Painted, 6¼¢; Galvanized, 7¼¢ ℔ pound. Ten-ton lots, ⅛¢ ℔ pound deduction from above price. No additional charge for thickset, Barbs 3 inches apart. Dealers may have the 10-ton quantities shipped in small lots, but shall not in such case be entitled to the rebate until the quantity is taken. Delivery—Free at Worcester and Boston, Mass.; New York and Buffalo, N. Y.; Cleveland, Ohio, and Chicago. Terms of payment—Sixty days' acceptance, or 2 per cent. allowance for cash, if paid in 10 days from date of invoice.

The price of Manila Rope was advanced half a cent on the 19th, making the list as follows, subject to the usual discount of 1 cent a pound.

	Cts. per ℔.
1¾ inch cir. and upward	15½
12 thread, or ⅜-inch diameter	16
6 and 9 thread, or ¼ and 5-16 diameter	16½
Hay Rope, 2, 3, 4 or 5 thread	15½
Bolt and Point Rope	17
Tarred Rope and Lath Yarn	15
Stave, Leather and Hop Twine	16

The Iron Jacket Oil Cans are made by Sidney Shepard & Co., of Buffalo, from tin plates, with a sheet-iron casing and wooden bottom to protect them from bruising. It is claimed that the iron jacket is stronger than wood, and far more serviceable, as they neither shrink nor swell, and do not split or fall apart. Every can is tested by steam and guaranteed to be tight. They are sold at 20 per cent. discount from the following list:

	Each.		Each.
1 gallon	$0.25	5 gallon	$0.68
2 "	.38	10 "	1.10
3 "	.47		

Plumb, Burdict & Barnard, Buffalo, have just completed an illustrated price list of the leading or more important lines of Bolts, Coach Screws, &c., manufactured by them. This price list or catalogue is of very convenient form and size, measuring 6 x 4½ inches; it is bound in cloth, embraces about 50 pages, printed on fine paper, and illustrated with cuts of their many styles of Bolts and Screws. The illustrations of the different patterns of Bolts, Screws, &c., each of which is numbered, are conveniently arranged in connection with a list of sizes and prices of its kind.

Haight & Clark, Albany, N. Y., issue an illustrated catalogue of Wire Workers' Castings, which shows a large line of Pickets and Rosettes, the cuts being full size.

The Rothweiler Mfg. Co., Newport, Ky., have issued an illustrated price list of tinners' tools and machine presses, &c., which contains several specialties of more than usual interest to sheet-iron workers. Among these may be mentioned a combined Squaring, Splitting and Trimming Power Shear—in other words, a Power Squaring Shear with several valuable attachments. This tool is new, having been patented within the present year. It is adapted to cutting heavy iron, and, among others, meets the requirements of safe makers, wrought-iron range builders and general workers in heavy gauges of the sheet metals. Robinson's Cornice Brake is also illustrated and described, while following it are Roofing Tools, Squaring Shears, Rim Machines and a general line of small tools used in the tin shop. A number of Punches, Bench, Screw and Drop Presses complete the book.

Singer, Nimick & Co., Steel manufacturers (Hogan & Son, agents) have removed from No. 59 Beekman street to more spacious and convenient premises, No. 243 Pearl and 18 Cliff streets.

The Stoddard Lock Co. are removing their factory from Bridgeport, Conn., to their premises, No. 104 Reade street New York.

Among our Special Notices is one from Charles Champion, Brantford, Ontario, who wishes to introduce American Hardware Specialties and Carriage Goods into Canada on commission.

E. G. van Riper, Consul of the United States of America, at Moscow, and Alexander Schnee, have formed a copartnership, under the name and style of E. G. van Riper & Schnee, as Russian-American commission merchants, for import and export.

IRON.

American Pig.—There is a firmer feeling in regard to American Pig, and a growing conviction that the bottom has been reached, more especially in the case of No. 1, which is comparatively in small supply, and for which the demand is larger than for a long time. Prices cover a large range. We hear of sales of No. 1 Foundry all the way from below $19 to $22, but in both extremes sales are exceptional and affected by special considerations. The Thomas Iron Co. report sales of 4000 tons Nos. 1 and 2 Foundry during the week at $20 and $19 respectively. They still decline to sell at these prices to any but their regular customers. We quote Foundry No. 1, $20 @ $21; Foundry No. 2, $18 @ $19.50; Gray Forge, $17.50 @ $19 at tidewater.

Scotch Pig.—We can report but little change in the Scotch Pig market. There is but little change in prices and the business done is of the same character as for some time past. The arrivals are not so large as to exceed the moderate demand. We quote: Eglinton, $21 from ship, $21.50 from yard; Carnbroe, $22 from yard; Glengarnock, $22.50 @ $23 from ship and yard; Dalmellington, $21.50 @ $22 from ship; Summerlee, $24 from ship; Coltness, $24.50 @ $24.75 from ship; Gartsherrie, $25 from yard; Langloan, $24 from ship.

Steel Rails.—No large sales are reported, the business being confined to very moderate transactions. We continue to quote $38, at mill, as the usual price.

Old Rails.—The market is a little firmer. We quote $22 @ $23, and note the sale of 6000 tons, delivered at Pittsburgh.

Bar Iron.—For some time past the Bar Iron market has been steadily growing more quiet each week, and is said to be duller now than it has been for several years. Declining values have destroyed all the consumer's confidence in prices, and he persistently abstains from unnecessary purchases, preferring to place orders for such stock as he may require to taking the risk of the unsettled condition of the market. Through the curtailing in quantity on orders and the somewhat depressed condition of machinery and other branches of similar trades, the demand for Bar Iron has dwindled to almost nothing, compared to that of a year ago. This of itself would make prices weak, but in connection therewith the manufacturers both East and West are striving hard to force sales, and many of them are offering to sell at rom a tenth to a fifth below to-day's quotations. On account of the dullness or lack of demand, the majority of the mills contemplate suspending for repairs for a much longer period this summer than has been their custom since the panic. Refined Iron is quoted from the mills at $1.90 @ $2.10, but exceptions are noted as to quality, as there are some brands that command a range as high as $2.25, though few sales are made. From store Refined Iron is quoted at $2.30 @ $2.40, and Common at $2.10 @ $2.20, as heretofore.

Scrap Iron.—The quietness of the market has forced prices a shade lower without having revived business. Selected Yard is now held at $24 @ $25, but the margin between sellers and buyers is too great, even at these figures, to anticipate trading to any extent. We learn of a few transactions in ex-ship at $23, the quality of the Iron being the governing feature in making the price.

METALS.

Copper.—Since our last report the market has been quiet, sales being limited to 100,000 ℔ Lake at 15¼¢ @ 15½¢, which is also the closing quotation, while other brands sell at 14¢ @ 15¢. London the last few days receded again 10/, coming £69 Best Selected and £64 Chili Bars. To-day we are cabled from there to the following effect: "Market a little weaker. Best Selected, £68. 10/ @ £69. 10/, and Chili Bars, £63. 10/ @ £64." Messrs. W. T. Sargant & Son, London, June 7, express themselves as under: "There are signs of an improving market. Chili Bars have been very largely dealt in; the lowest price touched was £61. 5/, a figure at which the market remained only a short time, and which seemed to be the turning point. At that figure, and at successively advancing rates, larger investments have been made by capitalists, and, considering the extremely moderate price of Copper, and that the whole available reserves are the smallest on record for many years, we should not be surprised to see a further considerable advance in prices during the next few months. Notwithstanding complaints of a quiet trade, the deliveries of Copper in France and England from January 1 to May 31 are returned as 34,797 tons, against 34,666 tons same time last year. Market closed to-day with strong buyers of Bars, for cash, at £64." Manufactures may be quoted as under: Bottoms, 24¢; Braziers, 24¢; Sheathing, 22¢, and Bolt Copper, 24¢. These rates, we presume, may still be shaded.

Tin—Has been inactive and unaltered, at 21¢ large lines Straits, 22¢ L. & F., while London quotes, as before, £94. Straits shipments first half of this month this way, 300 tons, and 200 tons to England. On the 15th inst. Messrs. William I. Russell & Co., 12 Cliff street, New York, made the visible supply on this coast 3072 tons, against 3198 tons last year; the price 21¢ for Straits, against 21⅝¢ in 1882; 20¾¢ in 1881; 17½¢ in 1880, and 15¼¢ in 1879. We are cabled this afternoon from London as under: "Market continues irregular. Straits, Ingot, £93. 15/ @ £94. 5/, and futures, £94. 15/ @ £95. 5/." Messrs. W. T. Sargant & Son, London, June 7, express themselves as follows: "There is not much of interest to report in the transactions of the past month; the price of Straits on the spot has fluctuated between £94. 5/ and £96. 10/. The tendency of the market lately has, on the whole, been weak. There is an absence of any strong demand in America. Dealers there seem contented for the present to work with minimum stocks. The figures of available supplies on May 31 are without material change from those at the end of the preceding month. The shipments from Australia turned out unusually heavy, and the Straits shipments since Jan. 1 to end of May are large. But if we extend the time of comparison to a full 12 months, ending May 31, it is seen that the increase in supplies from these parts is very moderate." *Tin Plates.*—There has been a steady but small demand to replenish low stocks. We quote at the close, large lots, ordinary brands, ℔ box: Charcoal Bright, $5.75 @ $6; do. Ternes, $5.20 @ $5.37½; Coke Tin, $5.12½ @ $5.20, and do. Ternes, $4.87½ @ $5. The Liverpool market has ruled very strong, Cokes at 16/ @ 16/6, and Charcoal at 18/6 @ 20/. We are informed per cable from London that the market is steady.

Lead.—There were sold during the week under review 200 tons St. Louis Refining Co.'s Corroding at $4.45, and subsequently about 300 tons Common at $4.40. The market here cannot be called either weak or strong; there is an absence of orders, and this keeps the market in a state of inertia, without any tendency to drop off suddenly. St. Louis has been active all along; the last quotation there is $4.15 for Corroding, and $4.10 @ $4.12½ Hard; freight, 30¢ from East St. Louis. Messrs. W. T. Sargant & Son, London, June 7, remark: "Lead continues to decline, and present quotations are as low as they have ever touched within many years past." We are cabled from there this afternoon as follows: "Market a little firmer. Common English Pig, £13 @ £13. 5/." Manufactures are quoted as follows: Lead Pipe, 6¾¢; Sheet Lead, 7½¢; Tin-lined Lead Pipe, 15¢ ℔ ℔., and Block-tin Pipe, 45¢, less the usual discount to dealers.

Spelter and Zinc.—Nothing has transpired during the week to break the even course of dullness that has characterized this metal for some time past. Improved advices lately received from Europe fail to have any effect here, where the metal shares the general apathy in the market, so that the few little sales of Common Domestic effected have gone at $4.60 @ $4.70, while Silesian is nominally 5⅛¢. *Sheet Zinc* has relapsed into apathy at 6¢ @ 6⅛¢. We quote Bertha Refined Spelter, 7¾¢ @ 8¢, and Bergenport, 9½¢. We receive from London the following cablegram to-day: "Spelter is a little weaker. Ordinary, £14. 17/6 @ £15. 2/6 at shipping ports."

Antimony—Is neglected for the moment at $9.70 for Hallett and $10.70 for Cookson. Messrs. W. T. Sargant & Son, London, June 7, quote English Refined £39 @ £46, and Australian £32 @ £34, adding: "Antimony is dull of sale, without material change in prices, either in Crude or Regulus."

COAL.

There is a further slight improvement in the Anthracite Coal trade, so that now prices are pretty well maintained. Some of the companies say they hear of no more cutting. There has been some talk about an advance in July, but nothing has been decided. It is thought probable that, should the measure be deliberately proposed, all might concur, though in some instances with reluctance, not deeming such a step desirable. Next week there will be half-time at the mines, the future layout to depend on circumstances. The advance spoken of is 10¢ @ 25¢ ℔ ton, according to size. In Western trade there is more activity, but Eastward the movement is slow.

The Bituminous trade is quiet and without change. Canal tolls on Cumberland have been reduced 10¢ ℔ ton.

The total amount of Anthracite Coal sent to market for the week ending June 9, as reported by the several carrying companies, was 494,734 tons, compared with 623,651 tons in the corresponding week last year.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	℔ ℔.	$ .12⅛	@	.13
" light	"	.10	@	.10½
Copper Bottoms	"	.10	@	.10½
Yellow Metal	"	.07⅛	@	.08
Brass, heavy	"	.09½	@	.10
" light	"	.07½	@	.....
Composition, heavy	"	.12½	@	.13
Lead, heavy	"	.04	@	.....
Tea Lead	"	.03½	@	.....
Zinc	"	.02¾	@	.....
Pewter, No. 1	"	.12	@	.....
" No. 2	"	.08	@	.....
Wrought Iron	℔ ton.	22.50	@	.....
Light "	"	12.00	@	13.00
Stove Plate	"	11.50	@	12.00
Machinery "	"	14.50	@	15.00
Grate Bars	"	4.50	@	.....
Stereotype Plates	℔ ℔.	.04½	@	.05
Electrotype "	"	.04¼	@	.04½
Small Type	"	.05	@	.05½

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen	℔ ℔,	3½c.	@	4 c.
White Cotton, New	"	3½c.	@	.....
" No. 2	"	2½c.	@	2¼c.
White, No. 1	"	3¾c.	@	4 c.
" No. 2	"	1¾c.	@	2 c.
Seconds	"	½c.	@	1 c.
Soft Woolens	"	5 c.	@	6 c.
Mixed Rags	"	1½c.	@	1¾c.
Gunny Bagging	"	1½c.	@	.....
Jute Butts	"	1¼c.	@	.....
Kentucky Bagging	"	.....	@	3¾c.
Book Stock	"	1¾c.	@	2 c.
Newspapers	"	1 c.	@	.....
Waste Paper and Scraps	"	½c.	@	.....
Kentucky Bale Rope	"	3½c.	@	4 c.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending June 19, 1883.

	Quan.	Val.
Dutch West Indies.		
Ptlm., gals.	4147	$423
Needles, pkge	1	30
Sew. ma., cs.	3	50
Hdw., cs.	11	204
Buckles, case	1	22
Cutlery, case	1	17
Copenhagen.		
Ptlm. gals	143,834	11,000
Ag. imp., pkgs	6	255
Hdw., pkge	1	46
Stettin.		
Ptlm., gals.	304,494	26,085
Sundsvall.		
Ptlm., gals.	206,306	17,700
Stockholm.		
Ptlm., gals.	175,695	17,250
Danish West Indies.		
Ptlm., gals.	1670	197
Mf. iron, pkgs	13	53
Hdw., pkgs	7	70
Nails, kegs	8	32
Clocks, pkgs	4	122
Dutch East Indies.		
Ptlm., gals.	738,880	76,048

	Quan.	Val.
Christiania.		
Hdw., cs	10	140
Ptlm., gals.	138,355	10,550
Arendal.		
Ptlm., gals.	148,150	12,000
Gefle.		
Ptlm., gals.	142,364	11,000
Riga.		
Ptlm., gals.	167,681	13,300
Hamburg.		
Ptl., gls.	1,374,020	109,455
Copper, bars	33	1,552
Clocks, pkgs	31	2,985
Wringers, cs	7	100
Sew ma., cs	945	20,737
Hdw., pkgs	14	613
Mf. iron, pkgs	7	488
Mach'y, pkgs	12	1,780
Copper, bbls	12	3,520
Ag. imp. pkgs	8	221
Ore, bxs	3	100
Wire g'ds, cs	6	101
Bremen.		
Ptlm., gals.	720,127	53,709
Hdw., pkgs	74	1,346
Mf. iron, pkgs	3	138
Hdw., pkgs	29	1,661
Ranges, cs	2	67
Clocks, pkgs	3	119
Mach'y, pkgs	2	261
Cop. ore, sks	242	1,300
Antwerp.		
Pumps, pkgs	9	565
Mf. iron, pkgs	19	100
Sew. ma., cs	11	1,040
Ptlm., gals.	882,050	77,750
Rifles, cs	3	451
Ag. imp. pkgs	24	540
Gun, case	1	175
Tacks, bxs	6	133
Rotterdam.		
Ptlm. gals	232,550	18,600
Clocks, pkgs	4	50
Hdw., cs	17	410
Mach'y, pkgs	7	395
Liverpool.		
M. rollers	1812	2,135
Ag. imp. pkgs	225	6,424
Hdw., pkgs	73	1,970
Clocks, pkgs	761	14,736
Gatling guns	2	2,750
Mf iron, pkgs	21	275
Tacks, bxs	4	50
Ptlm, gals	423,579	36,004
Copper, casks	90	15,680
Mach'y, pkgs	2	1,720
Guns, cs	5	62
Iron, bars	1254	1,212
Sew. ma., cs	275	5,610
Pumps, pkgs	2	96
Railroad cars	2	1,650
Air guns, case	1	38
Copper, pigs	220	8,800
Cop. mat., bgs	1639	18,000
Glasgow		
Mach'y, pkgs	12	1,345
Hdw., pkgs	10	197
Mf. iron, pkgs	5	750
Sew. ma., cs	568	9,461
Ag. imp., pkgs	4	232
London.		
Clocks, pkgs	423	10,941
Sew. ma., cs	277	4,688
Ag. imp., pkgs	145	4,623
Guns, cs	24	6,200
Pumps, pkgs	19	1,360
Stmpdwre, cs	5	120
Hdw., pkgs	246	6,578
Mach'y, pkgs	4	1,410
Mf. iron, pkgs	15	983
Cartridg's, cs	8365	201,383
Saws, case	1	70
Ptlm., gals	673,100	58,975
W. meters, cs	2	45
Cutlery, case	1	65
Hull.		
Ptm., gals.	366,150	32,900
Mach'y, pkgs	2	275
Ag. imp., pkgs	25	1,18[illegible]
Pumps, pkgs	8	475
Hdw., cs	51	1,263
Leith.		
Sew. ma., cs	1801	8,853
Hdw., pkgs	2	18
Newcastle.		
Ptlm., gals.	234,169	19,904
Sligo.		
Ptlm., gals.	151,057	12,840
Gibraltar.		
Scales, bxs	4	50
W. g'ds, pkgs	6	48
Hong Kong.		
Firearms, cs	4	500
Ptlm., gals.	530,000	49,025
British East Indies.		
Ptlm., gals.	510,000	52,785
British Honduras.		
Scales, bxs	11	40
Nails, kegs	9	32
Ptlm., gals.	9202	984
Guns, cs	5	620
New Brunswick.		
Pig iron, tons	100	1,350
Ptlm., gals.	17,031	1,751
Mach'y, pkgs	23	125
British West Indies.		
Nails, kegs	30	108
Pumps, pkge	1	25
Scales, cs	14	185
Clocks, pkgs	24	374
Saws, case	1	20
Ag. imp., pkgs	7	83
Mach'y, pkgs	7	135
Pistols, case	1	19
Stump pullers	2	126
Cutlery, pkgs	4	49
Guns, case	1	240
Zinc, cs	2	23
Hdw., pkgs	32	563
Ptlm., gals.	52,122	5,713
Mf. iron, pkgs	29	360
Stpdware., cs	9	121
Sew. ma., cs	13	107
Cartridges, cse	1	20
Cider mill, cse	1	34
British Guiana.		
Ptlm., gals.	15,008	1,525
British Australia.		
Mach'y, pkgs	54	2,976
Pumps, pkgs	41	1,621
Wringers, cs	18	364
Mf. iron, pkgs	7	111
S. rollers, cs	20	665
Scales and fixtrs., pkgs	174	3,408
Clocks, pkgs	43	883
Sew. ma., cs	107	2,453
Cartridges, cs	2	22
W. mills, cs	67	1,470
Hdw., pkgs	328	5,639
Saws, cs	5	586
Ptlm., gals.	125,920	15,729
Ag. imp, pkgs	121	4,036
Pistols, case	1	225
Cutlery, pkgs	142	1,868
W. cloth, case	1	11
Newfoundland.		
Ptlm., gals.	1767	145
New Zealand.		
Hdw., pkgs	544	9,909
Saws, cs	22	1,105
Ptlm., gals.	78,720	9,123
Pumps, pkgs	26	1,159
Wringrs. pkgs	25	547
Mach'y, pkgs	45	2,400
Nails, kegs	212	671
Clocks, pkgs	21	509
Mf. iron, pkgs	982	9,463
Axles, cs	13	639
Nails, cs	103	989
Cutlery, cs	12	173
Ag. imp., pkgs	115	1,960
Sew. ma., cs	9	260
Havre.		
Ag. imp., pkgs	99	6,644
Hdw., cs	2	103
Copper, casks	325	53,358
Copper, bars	315	13,988
Sew. ma., cs	11	168
Mach'y, pkgs	16	300
Marseilles.		
Clocks, pkgs	4	322
Sew. ma., cs	106	1,505

	Quan.	Val.
St. Loubes.		
Ptlm., gals.	296,250	21,200
French West Indies.		
Ptlm., gals.	5000	505
Spanish Possessions in Africa.		
Ptlm., gals.	21,000	2,110
Mf. iron, pkge	1	45
Cuba.		
Mf. iron, pkgs	538	8,633
Ptlm., gals.	29,490	1,363
Tacks, cs	7	152
Cutlery, case	1	144
Spikes, kegs	99	404
Clocks, pkgs	16	523
Nails, kegs	26	92
Steel, bdls	9	114
Nails, bxs	20	72
Locomotives	3	28,460
Boiler	1	285
Mach'y, pkgs	102	4,790
Iron roof	1	8,709
Hdw., pkgs	78	1,262
Saws, cs	2	37
Pumps, pkgs	5	337
Ag. imp., pkgs	69	2,370
Iron safes	2	108
Sew. ma., cs	10	170
Beyrout.		
Ptlm., gals.	180,023	16,400
Constantinople.		
Ptlm., gals.	183,210	18,448
Central America.		
Mf. iron, pkgs	87	801
Hdw., pkgs	24	474
Nails, kegs	70	275
Sugar mills	2	100
Mach'y, pkgs	19	773
Sew. ma., cs	58	903
Scales, cs	4	69
Firearms, cs	5	334
Ptlm., gals.	7570	807
Cutlery, cs	24	730
Zinc, cs	3	215
Cartridges, cs	2	19
Tacks, cs	2	46
Mexico.		
Mf. iron, pkgs	48	407
Hdw, pkgs	24	513
Clocks, pkgs	7	345
Plumb'rs' material, pkgs	6	684
Scales, cs	3	68
Cartridges, cs	4	215
Nails, kegs	7	130
Revolvers, cse	1	195
Ag. imp., pkgs	15	125
Brass g'ds, cse	1	30
Mach'y, pkgs	8	1,478
Cutlery, cs	3	92
Sew. ma., cs	12	420
Bells, case	1	32
Mf. iron, pkgs	5	18
Uruguay.		
Car wheels	80	560
Sew. ma., cs	8	170
Hdw., pkgs	27	1837
Cutlery, cs	11	402
Tacks, cs	9	254
Ptlm., gals.	20,000	2,000
Ag. imp., pkgs	402	17,295
Scales, cs	3	139
Nails, cs	70	315
Clocks, pkgs	5	68
United States of Colombia.		
Hdw., pkgs	171	3,341
Mf. iron, pkgs	164	1,899
Sew ma., cs	228	5,280
Nails, pkgs	43	134
Iron tanks	5	712
Scales	29	198
Sht. lead, pge.	1	15
Iron safes	5	1,032
Rifles, cs	2	132
Tacks, case	1	11
Per. caps, cs	4	687
Nails, cs	17	169
Copper, pkge	1	174
Saws, cs	2	54
Steel, pkgs	8	112
Anchors	8	51
Tinfoil, cs	3	105
Cutlery, cs	179	3,964
Mach'y, pkgs	54	4,484
Ptlm., gals.	5730	752
Cartridges, cs	26	308
Sht. zinc, cks	3	90
Clocks, pkgs	14	319
Ag. imp., cs	36	395
Pumps, pkgs	4	55
Revolvers, cs	6	1,154
Iron, pkgs	3	13
Firearms, cs	4	1,531
Needles, cs	3	27
Plumb'rs' materials, pkgs	2	17
Br. g'ds, case	1	57
Brazil.		
Iron, pkgs	16	89
Cartridges, cs	19	329
Scales, cs	58	201
Shoe nails, cs	16	103
Cutlery, cs	15	1,130
Sew. ma., cs	10	175
Arms, case	1	51
Pumps, pkge	1	46
L'd pipe, roll	1	41
Car wheels	19	130
Pumps, pkgs	5	184
Cott'n gins, cs	19	760
Ptlm, gals.	117,005	11,434
Hdw., pkgs	218	2,349
Rifles, cs	5	916
Needles, pkge	1	8
Mach'y, pkgs	5	230
Steel, bars	18	174
Lightn'g rods, pkgs	5	65
Ag. imp., pkgs	127	1,118
Santo Domingo.		
Ptlm., gals.	11,900	1,577
Sew. ma., cse	1	74
Mf. iron, pkgs	451	390
Mach'y, pkgs	59	2,350
Venezuela.		
Clocks, pkgs	8	248
Ag. imp., pkgs	23	392
Irons, pcs	20	73
Revolvers, cse	1	200
Buckles, pkgs	3	73
Eyelets, pkgs	2	20
Ptlm., gals.	28,110	3,861
Hdw., pkgs	45	730
Sew. ma., cs	86	1,914
Needles, cs	3	39
Pumps, pkgs	5	200
Mf. iron, pkgs	47	2,134
Nails, bxs	9	161
Mach'y, pkgs	19	743
Scales, cs	20	482
Tacks, bxs	21	64
Cutlery, cs	6	114
Hayti.		
Ptlm., gals.	4809	512
Mach'y, pkgs	5	106
Hdw., pkgs	15	154
Nails, kegs	19	58
Argentine Republic.		
Ptlm., gals.	93,000	9,358
Mf. iron, pkgs	71	644
Hdw, pkgs	411	6,735
Ag. imp., pkgs	1571	33,870
Irons, casks	30	527
Scales, cs	50	170
Genoa.		
Sew. ma., cs	182	2,750
Hdw., case	1	16
Ag. imp., pkge	1	6
Guns, cs	2	636
Fiume.		
Ptlm., gals.	189,531	13,700
Sandwich Islands.		
Locks, cs	3	150
Chili.		
Scales, pkgs	155	2,646
Cutlery, case	1	470
Nails, kegs	925	2,761
Wire g'ds, cs	38	562
Pistols, case	1	130
Mf. iron, pkgs	77	589
Ptlm., gals.	36,000	3,575
Clocks, cs	48	955
Tacks, cs	11	430
Ag. imp., pkgs	131	1,773
Hdw., pkgs	86	1,382
Saws, cs	6	70
Nails, cs	35	208
Cartridges, cs	3	130
Mach'y, pkgs	6	500
Car springs, cs	30	960
Stpdware., cs	2	111

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending June 20, 1883.

Hardware.

Berbecker T. & Co.
Packages, 40
Boker Hermann & Co.
Hdw., cutlery and guns, cs., 54
Clark G. A. & Bro.
Mach'y. cs., 5
Davies, Turner & Co.
Package, 1
Field Alfred & Co.
Mdse., cs., 44
Frasse P. A. & Co.
Mdse., cs., 2
Fuchs & Lang.
Mach'y. pkgs., 16
Hartley, Graham & Co.
Guns, cs., 15
Hemminghaus F. L. & Co.
Iron nails, cks., 110
Ivory J. W.
Mach'y, pkgs., 42
Johnson J. & Co.
Mach'y, pkgs, 245
Josephthal Bros.
Ironware, cs., 6
Knauth, Nachod & Kuhne,
Iron kettles, pgs., 52
Ironware, case, 1
Mach'y, cs., 2
Markt & Co.
Sundries, pkgs, 19
Mdse., cs., 21
Merchants' Dispatch Co.
Knives, case, 1
Mach'y, case, 1
Morton, Bliss & Co.
Nails, kegs, 250
Nails, cks., 950
Wire nails, kegs, 100
McCoy & Sanders,
Cases, 4
Moss F. W.
Files, cks, 15
Newhall Universal Mill Co.
Oil-mill mach., cs., 3
Newman Henry,
Ironware, cs., 6
Roesler A. & Co.
Case, 1
Ranft R.
Ironware, case, 1
Riesdahl A. de,
Nails, cs., 32
Reid J.
Sinks, tubs, &c., crates, 79
Bath tub, 1
Spelman W. B.
Nails, bxs., 60
Packages, 8
Seligman Bros.
Wire, case, 1
Schafer & Budenberg,
Mach'y., cs., 21
Scoville Mfg. Co.
Mdse., cs., 3
Shattuck & Binger,
Nails, bags, 303
Thomas J.
Mach'y, case, 1
Tiffany, C. L.
Cases, 7
Vom Cleff & Co.
Mdse., cs., 3
Wiebusch, Hilger & Co.
Hdw., cutlery and guns, pkgs., 39
Witte G. T. Bros.
Cutlery, pkgs., 11
Order,
Files, cks., 29
Mach'y, cs., 4
Cutlery, case, 1
Casks, 2
Skates, cs., 22
Cases, 5

Iron.

Alexandre F. & Sons,
Angle iron, bars, 86
Plates, 250
Couplings, pkgs., 19
Bundles, 19
Bars, 348
Abbott Jere & Co.
Wire, bdls., 7990
Baring Bros. & Co.
Rods, bdls., 19,300
Wire rds, bdls., 12,800
Wire rods, cls., 23,652
Rivet rods, coils, 1055
Bruckner, Evans & Co.
Wire net'g, rolls, 615
Wire net'g, bdls., 390
Brown Bros. & Co.
Bundles, 354
Coils, 669
Bruce & Cook,
Sheets, bxs., 40
Crocker Bros.
Spiegel'sen, tons, 220
Coddington T. B. & Co.
Boxes, 124
Bundles, 401
Duval H. R.
Oxide, cks., 29
Elliott, Son & Co.
Ore, kg., 9203
Field Alfred & Co.
Gas pipes, 2
Gesswein F. W.
Wire, case, 1
Great Western Disp. Co.
Ironware, cs., 1
Hill E.
Oxide, cks., 17
Johnson J. S.
Old iron, lot
Lang W. B.
Bars, 215
Case, 1
Lee James & Co.
Pig, tons, 100
Lilienberg N.
Bars, 7134
Nail rods, bdls., 562
Lundberg Gust.
Bars, 17,576
Mason John W. & Co.
Wire rope, coils, 22
Naylor & Co.
Spiegeleisen, cks, 197
Naylor, Benzon & Co.
Wire, bdls., 1424
Rail ends, tons, 113
Bars, 1437
Pim, Forwood & Co.
Fire bars, 141
Seligman & Co. J. & W.
Rails, pcs., 1206
Stobo Robert,
Pig, tons, 100
The Lalance & Grosjean Co
Bundles, 139
Order,
Pig, tons, 100
Crop ends, tons, 165
Coils, 340
Bundles, 153
Rods, bdls., 15,876
Wrought iron, pcs., 222
Wire, cs., 2
Wire, coils., 121
Wire bdls., 198
Rail ends, tons, 300
Spiegel, tons, 219
Cross ends, tons, 566
Nail rods, bdls., 1097
Wire rods, coils, 2962
Wire rods bdls, 9160
Coiled rods, bdls., 222
Old iron, tons, 121½
Mach'y scraps, tons, 50

Steel.

Abbott & Co. J.
Bar ends, bxs., 240
Cases, 23
Rods, bdls, 295
Broomhead, Geo.
Bundles, 79
Brown Wm. & Co.
Bundles, 100
Bars, 4
Carey & Moen,
Rods, coils, 402
Bundles, 141
Downing, Sheldon & Co.
Bundles, 40
Eagle File Works,
Mdse., case, 1
First Nat. Bank, Chicago
Blooms, 1040
Junge F. W. & Co.
Cast locomo. tires, 4
Manson B.
Wire rods, bdls., 30
Moss F. W.
Bundles, 5
Bar, 1
Plock & Co.
Car-wheel tires, 147
Tires, 61
Wagner W.
Bundles, 170
Cases, 86
Order,
Rods, bdls., 24,233
Wire, bdls., 367
Bands, 110
Cases, 14
Bundles, 653
Casks, 2
Blooms tons, 101
Rail ends, tons, 486
Old railway leaf, tons, 80

Metals.

Bank of Montreal,
Tin plates, bxs., 799
Baring Bros. & Co.
Tin plates, bxs., 661
Bouch Pals & Co.
Metallic caps, case, 1
Bruce & Cook,
Tin plates, bxs., 486
Terne plates, bxs., 63
Cuppies Samuel,
Gun caps, cs., 83
Carter, Hawley & Co.
Tin slabs, 159
Dickerson, Van Dusen Co.
Tin plates, bxs., 3438
Erie and Pacific Disp. Co.
Tin plates, bxs., 403
Field Alfred & Co.
Gun caps, cs., 4
Gt. West. Disp. Co.
Tin plates, bxs., 383
Gill M.
Box metal, 1
Heroy & Marrinner,
Tinfoil, cs., 14
Hibberd, Spencer & Co.
Tin plates, bxs., 750
Hoffstadt F. N.
Metal, cs., 19
Ketcham E. & Co.
Tin plates, bxs., 449
Lamarche H. & Bros.
Rolled zinc, cks., 56
Meyer G. A. & E.
Metallic caps, case, 1
Neider C. W.
Old metal, bbls., 6
Phelps, Dodge & Co.
Tin plates, bxs., 3625
Sheet zinc, cks., 100
Richardson W. R.
Old copper, bbls., 4
St. Louis Stamping Co.
Tin plates, bxs., 343
The Lalance & Grosjean Co.
Tin plates, bxs., 10
Tiemann & Co. D. F.
Zinc oxide, bbls., 53
Uhlman, Sig.
Metal ware, cs., 6
Van Brady A. & Co.
Tinfoil, cs., 6
Western Trans. Co.
Tin plates, bxs., 460
Witte John G. & Bro.
Metallic caps, cs., 54
Order,
Tin plates, bxs., 21,487
Zinc oxide, bbls., 25
Lead, pigs, 790
Spelter plates, 19,978
Old lead, bbls., 22
Old lead, pcs., 332
Quicksilver, bottles, 400
Black taggers, bxs., 143
Antimony, cks., 200
Tin sheets, cs., 53
Old spelter, bags, 92
Type, bxs., 12

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements during the past week :

IMPORTS.

For the week ended June 15 :

	1881.	1882.	1883.
Total	$7,949,127	$10,018,124	$10,430,279
Prev. reported	191,114,147	227,594,495	200,624,719
Since Jan. 1	$199,063,274	$238,512,619	$211,054,998

Included in the imports were leading articles of merchandise valued as follows :

	Pkges.	Value.
Antimony	40	$2,226
Brass goods	97	3,602
Bismuth	7	3,612
Bronzes	14	2,179
Chains and anchors	16	1,044
Clocks	12	759
Copper	...	6,491
Cutlery	137	41 649
Gas fixtures	14	1,719
Gold ore	52	50
Guns	52	11,414
Hardware	11	940
Iron, pig, tons	2,885	61,325
Iron, sheet, tons	38	2,823
Iron, other, tons	798	17,979
Machinery	425	27,794
Metal goods	305	23,470
Nails	205	1,927
Needles	21	6,120
Nickel	15	2,190
Old metal	...	13,096
Platina	2	6,490
Plated ware	1	152
Per. caps	18	1,559
Pins	1	118
Plumbago	319	3,384
Quicksilver	1,202	31,253
Saddlery	19	9,022
Steel	26,316	68,733
Spelter, lbs	540,415	18,283
Tin, bxs	33,389	151,730
Tin, 3,174 slabs, 338,235 lbs	...	75,334
Wire	633	1,833
Zinc, lbs	27,731	1,133

The quantity of hardware and metals imported compares with previous dates as follows :

	For the week.	24 weeks of 1883.	Same time 1882.
Cutlery, pkgs	137	3,296	3,419
Hardware, pkgs	11	653	508
Iron, R. R., bars	...	6,324	70,841
Lead, pigs	...	3,847	16,544
Steel, pkgs	26,316	1,772,671	954,154
Tin, bxs	33,389	845,913	1,034,049
Tin slabs, lbs	328,235	9,922,133	8,203,784

EXPORTS OF SPECIE.

For the week ended June 15 :

Total	$108,870
Previously reported	6,610,834
Total since January 1, 1883	$6,719,704
Same time in 1882	32,836,385
Same time in 1881	5,267,090
Same time in 1880	4,282,210
Same time in 1879	11,672,285
Same time in 1878	8,520,958
Same time in 1877	18,455,329
Same time in 1876	28,580,431
Same time in 1875	59,705,700
Same time in 1874	27,676,413
Same time in 1873	26,901,214
Same time in 1872	33,436,823

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended June 19 :

	1881.	1882.	1883.
Total	$7,709,500	$7,034,879	$7,153,823
Prev. reported	170,309,542	140,367,151	157,145,209
Since Jan 1	$178,018,601	$147,402,030	$164,299,032

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, June 19, 1883.

Pig Iron.—There is not much change to notice in this department ; the weakness and irregularity so frequently mentioned seem to continue, and for some brands our last quotations are barely maintained. The entire list may be called dull, and in many cases there are evidences of increasing weakness. This is particularly the case with brands holding a secondary position, although there is already a clear $3 ℔ ton difference in No. 1 Foundry, some selling at $19.50 @ $20, delivered, and others up to $22 @ $23, the greatest weakness being in the lowest-priced Irons. It is not likely that there will be any serious or permanent decline from to-day's quotations, but the market is very heavy, and it should cause no surprise to hear of lower prices before there is any reaction. The weakest of all grades is No. 2 Foundry, and, while usually quoted at $19 @ $19.50, delivered, there have been a good many sales at less money, and would probably be more if buyers could be induced to make offers for it in good-sized lots. No. 1 Foundry has sold fairly, but chiefly in small lots, consumers not feeling any great confidence in values. Mill Irons are quiet and fairly steady at prices varying from $18 to $19, delivered, a few choice brands still being held at $19 at furnace. The feeling in Mill Irons is not quite as strong as it was a week ago, and it is possible that lower prices will rule before the market recovers its tone. The demand has been somewhat more active, and, although sales have been on a liberal scale, the fact that there is a continued pressure to sell has a tendency to weaken prices, and that appears to be the prevailing influence to-day. Some well-known brands have, in fact, been sold at concessions on last week's figures, and it is a difficult matter to place anything in quantity at over $18 @ $18.50, delivered, although small lots of special makes command more money. White and Mottled Irons are dull, and in large supply at $16 @ $16.50, and $17 @ $17.50, delivered. Hereafter we shall quote prices delivered in Philadelphia, for the reason that a considerable amount of Iron is coming in from Virginia, and as the freights are much higher than from the districts from which supplies have hitherto been drawn, the price, f.o.b. cars at furnace, would convey very little idea of cost unless rates of freight were given, which in many cases is obviously impossible.

Bessemer Pig.—The market is quiet, with very little disposition to do business, except in lots of 1000 to 5000 tons each, for which $21 might possibly be obtained, latest transactions having been at that figure. Offers are not easily obtained, however, so that quotations are almost nominal.

Spiegeleisen.—Market very quiet, with buyers at about $31 for 20 %. A 1000-ton lot of 45 % sold at $47.25, for shipment to New York, and 30 % is offered at $37. A sale of 1000 tons, 10 to 12 %, is also reported at $25.50.

Blooms.—Market very quiet, and although prices are nominally unchanged, there is very little demand. We quote last week's prices, viz.: Charcoal Blooms, $59 @ $61 ; Run-out Anthracite, $50 @ $52 ; Scrap Blooms, $45 @ $46 ; Northern Ore Blooms, $43 @ $44.

Muck Bars.—There is considerable inquiry and prices appear to be a trifle firmer, $34.50 at mill having been generally realized for good qualities. Negotiations are in progress for about 2500 tons, which is likely to be closed at from $34 to $34.50 at mill.

Bar Iron.—The market has been very quiet during the week, and prices appear to have weakened a little, although nominally quotations are unchanged. A good deal of Iron has been offered for sale by Western manufacturers at prices varying from 2¢ to 2.1¢, delivered, but there has not been much business done, buyers preferring to take small lots as required. It was hoped that prices would remain steady in view of the temporary midsummer suspension of work, but there is so much anxiety to secure business that there has been a further development of weakness, and prices may be said to rule anywhere between 2.15¢ and 2.25¢ for Best Refined Iron, and 10¢ @ 15¢ less for a large proportion of Country Mill Iron. At the monthly meeting of manufacturers held in this city yesterday, it was resolved to continue 2.3¢ as the basis for labor, although the product does not realize that figure, but in view of the hot weather usual at this season, it was thought best to make no change, as the output in any case will not be more than from a half to two-thirds for the next month or six weeks. Prices are expected to hold steady in the meantime, and we are informed that inquiries for small lots are very numerous, indicating quite an active business within the next 10 or 14 days.

Plate and Tank Iron.—The demand during the week has been fairly active, and a further increase of business has been cited by several of the leading mills. Several hundred tons of Ship Plate have been sold at 2.3¢, delivered, besides which there has been a good demand for small lots. We also note a sale of 800 tons Steel Plate by the Co-operative Iron and Steel Works, of Danville, Pa., so that it is evident that consumers are being kept pretty busy one way or another. The demand for Tank Iron is not heavy, but the mills are tolerably well employed and prices are steady. Concessions may possibly be had on large lots, but the usual quotations are about as follows, say : Tank Iron, 2.4¢ @ 2.5¢ ; Shell, 3¢ @ 3.25¢ ; Flange, 4¢ @ 4.25¢, and Fire-Box, 5¢ @ 5.25¢.

Structural Iron.—There is not much of interest to report in this department, no sales of importance having been made, with the exception of about 2000 tons Shapes and Plates for the new cable road of the Union Passenger Railway Co. The mills are generally running up to their fullest capacity on former contracts, however, which, with the current demand for small lots, is likely to keep them pretty busy during the next month or six weeks. In the meantime it is believed that a good deal of new business will be coming forward, so that the position is considered fairly satisfactory. Prices are unchanged, as follows : Angles, 2.3¢ @ 2.4¢ ; Tees, 2.3¢, and Beams and Channels, 3.5¢.

Sheet Iron.—The demand has been of a more active character, and manufacturers are inclined to take a favorable view of things. Prices are somewhat irregular, and buyers of large lots are still in a position to command liberal concessions, but for small lots prices are steady and unchanged, as follows :

Common Sheets, No. 28	4½¢
Common Sheets, Nos. 26 and 27	4¼¢
Common Sheets, No. 21 to 25	4¢
Common Sheets, No. 18 to 20	3¾¢
Best Refined, ¼ ¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28	6¼¢
Best Bloom Sheets, No. 22 to 25	6¼¢
Best Bloom Sheets, No. 16 to 21	6¾¢
Common Red Plates, 3-16 to 16	3.2¢
Best Bloom, Galvanized, discount	40 %
Second quality, discount	40 %

Wrought Iron Pipe.—This department of the market presents no new feature. The demand continues light, and orders have been of a limited character. Buyers still adhere to the policy of buying to meet current requirements only. Prices are quotably unchanged at about as follows : 57½ % @ 50 % off list price on Boiler Tubes, and 70 % off on Gas and Steam Pipe. While manufacturers are not urging business to any great extent on account of the recent unremunerative prices, on special sizes, however, further discounts could probably be had.

Steel Rails.—There is very little to report beyond sales of lots of from five hundred to a couple of thousand tons each, at prices varying from $38 to $39, according to delivery. The demand is still for summer deliveries, buyers showing no disposition to place orders for winter or spring, although liberal concessions could be had on business of that kind. Mills are all well situated as regards summer work ; some are uncomfortably crowded already, while considerable new business is offered.

Old Rails.—Market quiet, and but little new business under way. T Rails are offered for shipment at $22, but buyers are indifferent and only take small lots as required, for which $22.50 @ $23 is obtained for good qualities. A sale of 1000 tons Double Heads was made yesterday for shipment to Philadelphia, at $26, at which the market may be called steady.

Scrap Iron.—The market is quiet, with sales at $24 @ $24.50 for selected quality. A cargo of about 500 tons from Hamburg was sold a day or two ago at $23, which is about all the market will afford for lots of that kind.

Nails—Have been in continued active demand, and manufacturers experience some little difficulty in keeping up with their orders. Small sizes are said to be very scarce indeed, and there is no over-supply of ordinary sizes. Prices may be quoted at about $3.15 ℔ keg, less the usual trade discount.

PITTSBURGH.

(*By Telegraph to The Iron Age.*)

PITTSBURGH, June 20, 1883.

Creditors of Graff, Bennett & Co., at a meeting this afternoon, granted an extension of three years. The liabilities of the firm are stated to be about $1,200,000 on their own account, and nearly $500,000 through the Graffton failure. The assets are reported at nearly $1,200,000, exclusive of real estate which is worth probably $1,000,000 more, and will be bonded for 60 per cent. of indebtedness. The affairs will probably be placed in the hands of trustees, who are not yet selected.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., June 19, 1883.

There has been but little change in the general business situation during the past week ; in some respects the outlook is better, while in others there is no improvement. The weather has been more favorable for vegetation, and the crop reports, as a rule, are more encouraging, although the heavy rains are reported as having done considerable damage to the corn and cotton in some sections of the country. The general Iron trade remains substantially as noted a week ago. As regards the raw article, some usually well-informed operators think the worst has passed, but others are not so confident. The demand for Finished Iron of all kinds is far from being satisfactory, although all, possibly, that can be expected at a time when business usually begins to fall off. It is reported that Messrs. Graff, Bennett & Co. have called a meeting of their principal creditors for to-morrow, at which, it is believed, arrangements will be made to bridge over the trouble caused by the complications of the Grafton Furnace Co., in which they are large stockholders. A number of mills have partially closed down, some altogether, and the probability is that others will follow within a week or two. The situation is anything but encouraging.

Ores.—The Ore trade continues in a very dull and depressed condition, and until Pig Iron revives and some of the many idle furnaces are again started up, no improvement in the Ore market can be expected. The stock of Lake Ore at the mines and on the dock at Cleveland is unusually large and increasing, while the consumption is small and growing smaller, caused by additional furnaces going out of blast. The consumption of Bessemer Ore is fully up to that of last year.

Pig Iron.—Dullness is still the order of the day, and is likely to continue until next month. Our home furnaces are doing about all the business, those at a distance refusing to sell at the prices obtainable. It is worthy of mention that the furnaces here in Allegheny County are nearly all in blast, and that the production is fully as large as ever it has been, the home furnaces having, as already stated, the market pretty much to themselves. About the only Iron being brought here is Bessemer, large contracts for which were made with outside furnaces several months ago ; however, while our home furnacemen are turning out a good deal of Iron, there is but little money being made, as the prices, under the most favorable circumstances, afford very little margin for profit. Foundry Irons are even more neglected than Mill. Foundrymen, without exception, report business very dull, and, unless there is a charge for the better, some of them will be obliged to suspend operations before long. Prices may be fairly quoted as follows :

No. 1 Foundry	$20.50 @ 21.00,	4 mos.
No. 2 "	19.00 @ 20.00,	4 "
Gray Forge Neutral	17.50 @ 18 00,	4 "
Red Short Mill	18.50 @ 19 00,	4 "
Charcoal Foundry	25.00 @ 27.00,	4 "
Cold-Blast Charcoal	28.00 @ 33.00,	4 "
Bessemer	21.00 @ 21.50,	4 "

It is intimated that round lots of Bessemer Iron can be bought below our inside quotation.

Muck Bar.—There have been no sales reported since our last, in the absence of which we continue to quote at $34 @ $34.50, cash, at mill.

Manufactured Iron.—Demand light and no immediate improvement looked for before the middle of next month ; prices are weak, and while manufacturers continue to quote on basis of 2¢ for Bars, it is probable that well-assorted orders could be placed for a tenth less. Sheet Iron is quoted on a basis of 3.65¢ @ 3.70¢ for No. 24, and Plate, 2.60¢.

Nails.—Buyers are becoming a little bearish, and manufacturers are more disposed to make concessions in order to obtain desirable orders, yet, so far as we can learn, prices are substantially the same as a week ago—$2.90, 60 days, 2 % off for cash, for carload lots and upward, and $3 in a jobbing way. There is no stock in first hands, makers still having orders sufficient to absorb their production, and while this continues it is not likely there will be much cutting in price. At a meeting of the Western Association last week, there was nothing done beyond regular routine business.

Wrought Iron Pipe.—Trade continues good, with prices weak, but unchanged. Discounts unchanged—70 and 5 @ 70 and 10 % on Gas and Steam, and 55 and 5 % on Boiler Tubes.

Steel.—The general condition of the Merchant Steel trade remains unchanged ; demand continues light for the season ; but few, if any, of the mills are working up to anything like their full capacity, and prices are weak and irregular. The National Steel Association, which has been in a weakly condition for some time past, has at last dissolved ; hence the market is now in the go-as-you-please condition.

Old Rails.—The market has stiffened up materially within the past week, and prices are higher ; consumers who bought largely at $22.50, now quote at $23 @ $23.50, and we are cognizant of a sale of a lot of 500 tons of a special brand for short delivery at $25.

Steel Rails.—We still quote at $38.50 @ $39, cash, at mill, for near-by delivery. Mills are well supplied with orders, being sold several months ahead, but they are still able to take any desirable orders that offer. The Edgar Thomson Works continue to make liberal shipments West and South, both by river and rail.

Railway Track Supplies.—Spikes remain unchanged at 2.60¢, 30 days, with a fair business. Splice Bars unchanged at 2¢. Track Bolts lower—3¢ with Square and 3.20¢ @ 3.25¢ with Hexagon Nuts.

Scrap.—The dullness noted for some time past continues, and there is so little doing that it is difficult to give reliable quotations. No. 1 Wrought is nominal at $22 @ $23 ℔ ton for Ordinary, and $24 for Selected ; Old Car Axles, $32 @ $33. In Crop Ends consumers are well supplied ; hence there is no demand and no sales, in the absence of which we continue to quote at $25, gross, which is as low as they could be sold at if wanted. Old Car Wheels nominal at $20 @ $21, gross.

Window Glass.—There is, possibly, an improved demand, but prices are no better ; discounts 70 % from regular list on Single and 70 and 10 % on Double Strength for carload lots and upward.

Coke.—There has been no change in the situation during the past week ; demand continues light, and prices are still in buyers' favor. We continue to quote at 87½¢ @ 90¢ ℔ ton, free on cars at ovens. The shipments out of the region are reported at 60,000 tons per week. Several attempts have been made recently to form an association with a view to taking action in regard to production.

Coal.—There has been good coal-boat water, with the exception of a few days, ever since February, and there is scarcely any Coal here in first hands.

CHICAGO.

Office of *The Iron Age*, 36 and 38 Clark St., cor. Lake, CHICAGO, June 18, 1883.

Hardware.—Shelf and Heavy Hardware have been in good request during the past week, and values continue firm.

Nails.—The demand for 10d. to 60d. continues good, and they are held firm at $3.25 ℔ keg in small lots, with 2 % off for cash, and an additional 10¢ off for carload lots.

Manufactured Iron.—The market for Merchant Iron has undergone no material change during the week past, while the demand continues fair and quotations are unchanged. We quote Bar, 2.20¢ @ 2.30¢ rates ; Angle Iron, 3¢ @ 3.20¢ rates ; T Iron, 4¢ rates ; Beams, 3.80¢ ; Channels, 3¢ ; Nos. 10 to 14 gauge, 3.20¢ rates ; Nos. 15 to 17 do., 3.50¢ ; Nos. 18 to 21 do., 3.80¢ ; Nos. 22 to 24 do., 4¢ ; Nos. 25 and 26 do., 5¢ ; No. 27, 5.20¢, and No. 28, 5.60¢. These quotations would be shaded on large lots from 1-10th to 2-10ths cent per pound. Norway Original Bars, 4½¢ rates ; Norway Rerolled Bars, 5½¢ rates ; Ulster, 4½¢ rates ; Low Moor Iron, 8¢ rates ; Nuts and Washers, 8¢ off list ; Wrought Boat Spikes, 3¢ rates.

Pig Iron.—The demand for Pig Iron in this market during the week has been fair, and quotations are a trifle firmer. We quote : Lake Superior, Nos. 1 and 2, $23 ; No. 3, $24, and Nos. 4, 5 and 6, $25, 4 mos. ; Briar Hill, $25 ; Himrod, $23 ; Crane No. 1, $25 ; No. 2, $24 ; Thomas, $24 @ $26 ; American Scotch, $24 @ $25 ; Du Val, No. 1, $23.50 ; No. 2, $22.50 ; Fulton Notch, No. 2, $22.50 ; No. 3, $21.50 ; Calumet, $23 @ $23.50, 4 mos. ; Imported Scotch, $27 @ $28 ; Southern Coke, No. 1, $23.35 ; No. 2, $22.35 ; Low Moor, No. 1, $24 ; No. 2, $22.75, 4 mos. Silvery Soft, $21 @ $22.

Steel.—Tool, Machinery and Agricultural Steel are in fair request, particularly the latter, while prices continue unchanged. We quote as follows : Tool, 11½¢ ; Machinery O. H., 5¢ ; Crucible Machinery, 7¢ ; Hammer, 2 inches and under, 8¢ ; over 2 inches, 9¢ ; Cast Spring, 6¢, and O. H. Spring, Tire and Sleigh Shoe, 5¢ ; Sheet, first, second and third quality, 12¢, 10½¢ and 8½¢ respectively ; Crucible Plow, 6¢ ; Eagle Plow, 5¢ ; Iron Center Plow, 9¾¢, and Soft Steel Center Plow, 9¾¢ ; Cast Plow, 5¢ ; German Plow, 4½¢.

Scrap Iron.—The market is quiet, there being but little demand. We quote as follows, which are dealers' purchasing prices : No. 1 Railroad Wrought Scrap, ℔ net ton, $21 ; No. 1 Country Wrought Scrap, ℔ net ton, $17 ; No. 1 Cast Scrap, ℔ ton, $15 ; No. 1 Stove Plate Scrap, ℔ ton, $10 ; Machine Shop Wrought Turnings, ℔ ton, $9 ; Cast Iron Borings, $7 ; Old Plows and Plow Steel, $11 ; Malleable Scrap, $5.

EVERETT & POST, 156 Lake street, Chicago, report to us as follows, under date of June 16, 1883 : *Connellsville Foundry Coke.*—The past week has shown no improvement in Coke. There have been sales of Connellsville Coke (not Connellsville Foundry Coke) as low as $5, and West Virginia at $4.75 ℔ ton, Chicago. Prime Connellsville Foundry is unchanged, it being in fair demand. The large producers are not pressing sales, but are quietly looking on, awaiting developments. *Pig Lead.*—During the past week the Pig Lead market has shown some improvement. Sales have been made of about 900 tons Common and Refined at prices ranging from $4.13 to $4.17½, and 700 tons latterly, special brands, at $4.20 here, for local consumption principally. Market closes firm at $4.17½ and $4.20.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, June 18, 1883.

The weather is hot. Preparations for Fourth of July frolics and removal to country resorts occupy those who have taste for the one and leisure and money for the other, more than business. There is nothing very attractive in most lines of trade at best, and those not forced to go on stop or move slowly Production of all heavy materials, except such as are used by builders, runs lower and lower, with a prospect that the minimum by fall will resemble the output of the summer of 1878. Crop prospects in the Southern section are good.

Pig Iron.—There is a tendency to hold Metal out of the market, and stocks are now so low that holders generally experience no difficulty in carrying them. A few furnaces have contracts they made in 1882 for this summer's delivery, and their owners are cheerful. Economy enables others to sell their lower grades at a little reduction on quotations and still realize a small profit. We quote : No. 1 Foundry, $19 @ $20 ; No. 2 Foundry, $17 @ $18 ; Gray Forge, $16 @ $17 ; White and Mottled, $15 @ $16.

Ores.—We quote : 50 % Brown Hematite, ℔ ton, $2 @ $2.75 ; Red Fossil, $1.75, @ $2 delivered at furnace.

Miscellaneous Articles.—Roads generally throughout the section are replacing Iron with Steel Bars on heavy grades and curves, and this keeps the stock of Old Rails full. We quote them weak at $22 @ $23 ; Wrought Scrap, $18 @ $20 ; Cast Scrap $11 @ $12 ; Old Wheels, $22, and dull.

Nails—Are steady at $3 for large bills, 60 days, 2 % for cash ; $3.10 in a jobbing way

Manufactured Iron.—Bar is slow at $2 for round lots, assorted sizes ; Spikes, $2.50 ; Track Bolts, $3.20 ; Fish Plate, $2.

Coal.—We quote Fancy Lump, $3 ; Common, $2.50 ; run of mine to manufacturers, $1.75 at mills.

Coke.—We quote Furnace Coke, $3 at point of consumption ; Foundry, 10¢ @ 12¢ ℔ bushel.

CINCINNATI.

JUNE 18.—*Pig Iron.*—The foundries and rolling mills in this region are in full operation, drawing their supply of Pig as they need it for immediate uses, and at prices below the average cost of production. The higher grades of Charcoal, Coke and Stone-coal makes are not, in quantity, in excess of requirements for daily uses, and prices are fairly well maintained, while all other grades can be had at about the consumer's views. The difference between the quotations of

Iron produced in this region and such as are known as "Southern Irons," arises from the above causes and a seeming appreciation of quality on the part of consumers. Sales during the past week justify the following quotations: No. 1 Hanging Rock Charcoal Foundry, Best brands, $25; Good No. 1, $24.50; Southern Charcoal Foundry, $21 @ $22; No. 2, $1 less; Hanging Rock Coke, Best, $22; Good, $21; Southern, $19 @ $20; No. 2, $1 less; "American Scotch," No. 1, $20 @ $21.50; No. 2, 50¢ @ $1 less; Silver Gray Softeners, Best No. 1, $21; Good, $20; No. 2, $19; No. 3, $18 @ $18.50; Forge, $17 @ $22; Stonecoal, Coke and Charcoal Car Wheel, Warm Blast, $25 @ $26; Cold Blast, $26 @ $29. *Scrap Iron* is largely in excess of wants. No sales to enable quotations. The rolling mills are reported to be using largely of Scrap in their finer grades of Iron, encouraging holders to withhold their large stocks.

LOUISVILLE.

GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of June 16, 1883: There is an active demand for Hot Blast grades and the market is much firmer. We quote for cash as below:

FOUNDRY IRON.

No. 1 Hanging Rock Charcoal	$25.00 @ 26.00
No. 1 Southern Charcoal	21.50 @ 22.00
No. 1 Hanging Rock Stonecoal and Coke	20.50 @ 21.00
No. 1 Southern Stonecoal and Coke	20.50 @ 21.00
No. 2 " "	19.00 @ 20.00
"American Scotch"	19.00 @ 20.00
Open Silver-gray	18.00 @ 19.00
Close "	17.00 @ 18.00

MILL IRONS.

No. 1 Charcoal	20.00 @ 20.50
No. 1 Stonecoal and Coke, Neutral	18.00 @ 19.00
No. 2 " "	17.00 @ 18.00
No. 1 " Cold-short	17.50 @ 18.00
No. 2 " "	16.50 @ 17.00
White and Mottled, Cold-short and Neutral	15.50 @ 16.00

CAR WHEEL IRONS.

Hanging Rock, Cold-blast	32.00 @ 35.00
" Warm-blast	25.00 @ 27.00
Alabama and Georgia, Warm and Cold-blast	27.00 @ 28.00
Central Kentucky, Cold-blast	25.00 @ 28.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 115 to 121 West Main street, report to us as follows, under date of June 15, 1883: There has been a slightly better tone to the market during the past week. The first scare, brought about by the flood of cards and circulars announcing that the mills would run through the summer, has subsided, and those who had not overbought are inquiring for small lots to sort up stock as may be necessary. Buyers are not in for large quantity, but confidence is being re-established somewhat by the improved crop prospects and reports of increased railroad earnings. Bar Iron—In plentiful supply, but price fairly maintained, say 2.10¢ @ 2.20¢. Hoop and Band.—Prices unchanged; demand very light. Bar mills are soliciting Bands at lower price than the association asks. Sheet Iron.—Prices well upheld on heavier numbers; some concessions on light. Nails are being well managed by the association, who expect to close down the mills temporarily July 1st. Demand is fair, but there is next to no margin to jobbers. The smallest lots are seeking purchasers at the inside price. Fence Wire.—Market very weak for Barbed Wire. There is no telling where bottom is until the result of the late decision of the United States Court at St. Louis is definitely settled.

RICHMOND.

ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows, under date of June 18, 1883: The prospect for our furnaces is improving. Large purchases have recently been made for future wants, and in consequence prices are firmer.

No. 1 Scotch Pig Iron	$23.00 @ 26.50
No. 1 Anthracite Pig Iron	21.00 @ 23.50
No. 2 " "	20.00 @ 22.00
No. 1 Virginia Coke Pig Iron	20.00 @ 22.00
No. 2 " "	19.00 @ 21.00
No. 3 " "	18.00 @ 19.00
White and Mottled	16.00 @ 17.50
Virginia C. B. Charcoal	26.00 @ 28.00
Old Dom. Nails (carlo d lots)	3.00 @ .....
" Refined Bar Iron (base)	2 2-10¢
Old Iron Rails	21.00 @ 22.00
Wrought Scrap, No. 1	20.00 @ 21.00
Cast Scrap, No. 1	16.00 @ 18.00
Horse Shoes (Tredegar)	4.25 @ .....
Mule " "	5.25 @ .....

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of June 18, 1883: There has been a fair average trade doing for the past week, notwithstanding the acknowledged general depression elsewhere. Values continue ruling quotably unchanged at annexed figures:

Ref. Bar Iron, 1 to 6 x ⅜ to 1	℔	2¼ @ 2.35¢
" " 1 to 4½ x 1½ to 1	℔	2¼ @ 2.35¢
" " ¾ to 2, Round and Square	℔	2¼ @ 2.35¢
Hoop Iron, 1¼ wide and upward	"	3 2-10 @ 3 3-10¢
Band Iron, from 1½ to 6 in. wide	"	2 7-10 @ 2 8-10¢
Horse-shoe Iron	"	3¼ @ 3½¢
Norway Nail Rods	"	5¼ @ 5½¢
Black Diamond Cast Steel	"	11 @ 12 ¢
Machinery Steel	"	4½ @ 5 ¢
Spring Steel	"	4 @ 4¼¢
Common Horse Nails	"	10 @ 11 ¢
Railroad Spikes, 5½ x 9-16	"	2 6-10 @ 2 7-10¢
Perkins' Horse Shoes, ℔ keg of 100 lb		$4.37½
" Mule Shoes		5.37½

ST. LOUIS.

HOFFER & Co., Pig Iron and Iron Ore Merchants, 214 Pine street, report to us as follows, under date of June 16, 1883: The market is still unsettled. We quote nominally as follows:

HOT BLAST CHARCOAL IRONS.

Missouri	$20.50 @ 20.50
Southern	20.00 @ 21.00
Ohio	25.00 @ 26.00

COAL AND COKE IRONS.

Missouri	20.00 @ 20.50
Southern	18.50 @ 20.00
Ohio	20.00 @ 25.00

MILL IRONS.

Red Short	18.50 @ 20.00
Neutral	17.00 @ 18.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	21.00 @ 22.00
Southern	25.00 @ 28.00
Ohio	23.00 @ 30.00

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From Our Regular Correspondent.)

LONDON, ENG., June 4, 1883.

THE OUTLOOK

is very much the same as at the date of my last letter, the variations of the past week having been comparatively few in number and unimportant in their scope. Everything in the branches of trade in which your readers are most interested is very quiet—indeed, I have been assured by parties likely to know that "there is really nothing whatever doing." I am willing to accept this as being a metaphorically correct statement, and in that sense only, because it is beyond dispute that almost the whole of the works, whether engaged in the production of iron or steel, are still well employed. In isolated instances there are establishments which have run through their orders more rapidly than their neighbors, but, taking the trade as a whole, I should still venture to assert that there is plenty of work in hand at the present time. There is an abundance of grumbling in all directions, I admit, but, so far as my information goes, the complaints are made not so much on account of a lack of orders as in respect of the low prices at which alone they are to be secured. Profits are doubtless meager in the majority of instances, yet it is by no means certain that the current values are those at which much of the material is being sold. I should rather be disposed to think that the contrary is the rule, and that the bulk of the iron and steel in course of delivery is being paid for at higher prices by 10 to 20 per cent. than those now obtaining. In certain cases we know that this is so. Bolckow-Vaughan's, for instance, are said to be sending steel rails to your side at $62 per ton, as against the $36 to $38 of the time being, and there are other examples of a similar state of affairs. To all this, however, there must come an end before long, and it is the uncertainty as to what may then take place that puzzles the iron men. To all appearance we have a dull time before us, and there is every likelihood of values taking a permanently lower range; yet surprises may be in store and we may experience their effects directly after midsummer. How this "surprise" theory is to be worked out, however, nobody is prepared to elucidate. For one, I fail to see where it comes in—unless your people are playing an exceptionally 'cute game in order to dish the Britishers on the new tariff. Certainly we have not the most remote grounds for anticipating unexpected developments in any other direction, all the European and most of the Colonial markets being characterized by decided quietude and an entire absence of hopeful features. Whether your market will yield the eagerly looked for crop of orders for deliveries after July 1 is not yet apparent, but should be manifested in the course of the next few weeks if it comes along at all. Some of our people here had built some *chateaux en Espagne* on the foundation of the expected great strike of your ironworkers on June 1, and have doubtless been somewhat disappointed by the compromise arrived at between the American ironmasters and their workmen. It had been inferred that the cessation of production at and about Pittsburgh would have been the cause of many contracts being sent to Great Britain. The expectation in that direction having been disappointed, there is now a disposition manifested to regard the settlement as a remarkably favorable symptom. It is held that your ironmasters would certainly not have signed a continuance of the old wages scale had they not known that they could obtain a sufficient amount of work on that basis of prime cost; consequently, the inference is that your iron trade is not really so bad as it had been represented to be. These may be deemed more or less ingenious speculations by you who are on the spot and fully posted as to the "true inwardness of things" in your own centers, but they exist here as I have outlined them, and you may take them for what they are worth.

As for the capabilities of our own market, there is not a great deal to be said or written, although it must be confessed that a rather more buoyant tone is encouraged. This may be merely the outcome of the continued fine weather, under the influence of which all kinds of agricultural operations are highly favored, and the crops are coming forward in splendid fashion. Everything looks well, and the promise of a good hay and cereal harvest naturally puts the farmers in better spirits. For the same reason all outdoor occupations are flourishing, and the "season" trades are in fuller swing. Should the sunshine continue (as it has done now for nearly a month past almost without interruption) for another month or so, I think it highly probable that all our leading manufactures will take a turn for the better.

MY IRON MARKET SUMMARY

on this occasion must needs be brief, seeing that the happenings of the week have been extremely uneventful. At Glasgow there has been something like a relapse in warrants, which have declined in value from various causes. They touched 46/7½ on May 28, which was the lowest point for two years past, the minimum of 1882 having been 46/8 on April 20 of that year. Since the advent of June there has been only a slight recovery, and present quotations are not firm at 46/9 @ 46/10. It is believed that even lower prices may prevail, unless (as it is rumored) the furnaces at Markland are to be stopped. On the other hand, it is in contemplation to restart one of the furnaces at Lumphinnans. Under all the circumstances, the continued large production in Scotland shows that a large business is being done, especially if it be true that stocks in makers' own yards are not increasing. An assertion to that effect comes to me from Glasgow, whence we have absolute statistics showing a further decrease in Connal's stocks. Whether there is an increased demand from the United States will shortly be known. It is hinted that such is the case, and the allegation is supported by an advance in freights for pig iron by regular steamers to New York from 5/ to 7/6 ℔ ton. The proximate sailings are filled up and the new rates are for near futures. Last week 2150 tons were sent to the United States and 520 tons to Canada, despite which fact merchants are said to be in receipt of discouraging advices from your side. Makers' brands, however, are still realizing what must be deemed good prices, and it is believed that smelters are making paying profits, as an outcome of recent economies in production and enlarged outputs. The shipbuilding yards on the Clyde are as busy as ever. During May they launched 29 vessels of 35,731 tons aggregate, as against 28 vessels of 32,200 tons in May, 1882. The total tonnage for the five months of 1883 is 20,000 tons ahead of 1882 to the same date. Many new orders have recently been placed, and the whole of the yards have ample employment for the remainder of 1883. So long as this briskness obtains, a large amount of work will be furnished to the iron and steel werks. Precisely the same observation holds good in relation to the North of England, where the yards of the Tyne, Wear and Tees are all fully engaged. It is certain, indeed, that iron shipbuilding is the mainstay of the iron producers, and that were it not for the sustained activity of that branch the plate, &c., mills would be deplorably short of work. At Middlesboro' pig iron is very quiet and depressed. Some of the manufacturers uphold 40/ as their nominal figure, but 39/6 is readily accepted, and 39/ is known to have been taken in more than one instance. Shipments are good, nevertheless, and the local consumption is large, but is checked by the strike at Bolckow-Vaughan's Works. During May the shipments reached about 87,000 tons, which is ahead of expectations and a large advance over the total for April last. Hematite pig irons are almost without a feature to note. On the West Coast mixed lots are quoted at 50/ @ 51/, and makers' own brands are proportionately low. Nothing of note has been done in the way of lowering the rate of production, albeit stocks still increase and are now so bulky as to prejudice any recovery in values most seriously. Whether or not the agreement has been broken I cannot say, but I do know that it was entered into, inasmuch as the secretary formally communicated the fact to me, and I cabled the news to you next day. In other of the smelting districts there is no movement. The mills and forges, as well as most of the foundries, devoted to heavy ironwork are fairly engaged, while the producers of ship, boiler and armor plates are extremely busy. The success of compound armor (about one-third steel and two-thirds iron, the steel on the face) has been very marked in recent trials, and has led to the placing of heavy commissions at Sheffield by various European Governments. In fencing wire there is only a modest turnover, and competition with the German and Belgian houses is keener than ever. Some of the producers of galvanized iron report themselves rather better off for orders, but values are low and much cut up. Some inquiries for this material are said to have been received from your side, but I have not heard of any sale of note. In that, as in other respects, much will depend as to the rate of duty levied by your customs authorities on and after July 1st next. Marked Staffordshire bars remain at £7. 10/, and all other grades of ordinary finished are purely nominal at late rates. Sheets are in a trifle better request, but the improvement is not as yet of much import. In iron rails there is a fair business in very light special sorts. Old rail are sluggish at £3. 7/6 @ £3. 8/6 ℔ ton, net cash, f.o.b. London, for D. H., with freights hence to New York at 7/6 @ 8/6 ℔ ton. Heavy wrought scrap is in moderate request at £2. 17/6 @ £2. 18/6 ℔ ton, f.o.b. London, &c. Bessemer blooms are not wanted, but sales are reported of bloom ends. Rail crop ends are nominal at 58/ @ 60/, f.o.b. usual ports, and fair sales are reported to United States buyers. Old scrap leaf spring steel stands at £4 ℔ ton, f.o.b. London, nominal. In steel rails there is little news, and there are few new sales. Among recent attractions I hear of a lot of 10,000 tons 56-℔ for New Orleans, which is said to have been placed with the Ebbw Vale Works at £4. 12/6 ℔ ton, f.o.b. Newport, Mon. Most of the mills are well employed, and some have orders for the whole of 1883.

SCOTCH PIG IRON

has been dull throughout, despite efforts made on two or three occasions to infuse speculation into the market. The failure of these attempts would seem to prove that the outside public believe the lower range of prices to have attained a certain degree of permanency, besides which there is a general feeling that it is only a question of a few weeks for the decrease in stocks to be converted into an increase. The weekly decreases are now small and less pronounced each succeeding week, while one of several causes may bring about the opposite result at any moment. There are now 117 furnaces at work in Scotland (against 108 this date 1881), including 8 on hematites. In Connal's stores the quantity held is 578,635 tons, against 637,427 tons a year ago. Last week's decrease was 280 tons only. Shipments last week were 4370 tons more than in the same week of 1882, but to date there has been a diminution of 2561 tons this year, with a total of 247,549 tons. The importations of Middlesboro' pig into Scotland last week increased by 6930 tons, making an increase this year of 8320 tons on a total of 105,332 tons. Writing from Glasgow on June 1, James Watson & Co. said: "During the week the Scotch iron market has been very dull, but it closes firm this afternoon, owing to some speculative purchases, The demand for makers' iron is very quiet and prices are naturally lower. The Middlesboro' market is weaker and quotations are again easier. The warrant market on Monday forenoon opened firm, the price advancing from 46/7½ to 46/10, relapsing in the afternoon to 46/8 ℔ ton. On Tuesday the market again rallied to 46/9½, dropping back to 46/8, cash. On Wednesday a small business was done between 46/9 and 46/8 ℔ ton. Yesterday the market was flat, with a fair amount of business done between 46/8 and 46/6 ℔ ton, while to-day the market has been very firm, the price advancing to 46/10, closing with sellers at that figure. The shipments last week were 14,130 tons, as compared with 9760 tons for the corresponding week of last year." We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	48/	46/
Clyde, "	50/6	48/6
Coltness, "	61/6	54/
Langloan, "	62/	54/
Gartsherrie, "	58/	54/
Summerlee, "	59/	50/6
Calder, "	59/6	50/6
Carnbroe, "	54/6	49/
Glengarnock, at Ardrossan	54/6	48/
Eglinton, "	48/	44/6
Dalmellington, "	49/	48/
Shots, at Leith	61/6	56/
Kinneil, at Bo'ness	48/6	47/
Carron, at Grangemouth	50/	48/6

MIDDLESBORO' PIG IRON

was dull throughout last week, but it appears probable that the returns as to the May shipments, which have just become known, will exert a favorable influence at to-morrow's weekly 'change meeting. The strike at Bolckow, Vaughan & Co.'s Eston Works is having a bad effect, however, and until that dispute is settled other conditions will be greatly modified. For No. 3, 39/6 @ 39/9 is the open rate, but 39/6 has been freely accepted, and in some cases there have been sales at 39/ ℔ ton. For G.M.B., f.o.b. at makers' wharves in the Tees, net cash, less 2½ %, current prices are:

No. 1 Foundry	43/9	Mottled	38/3
" 2 "	41/9	White	37/9
" 3 "	39/9	Refined Metal	55/6
" 4 "	39/3	Kentledge	40/
" 4 Forge	38/9	Cinder	35/

A start has been made during the week at the Northeastern Steel Works, at Middlesboro', which have been erected to carry out the basic process. W. G. G. Thomas is one of the directors of the company.

HEMATITE PIG IRON

is unaltered and without any animation, as also are hematite ores. Cumberland ores are quoted 10/6 @ 12/ and Furness ores 9/ @ 12/ ℔ ton at the mines, while Spanish ores meet with no demand at all in the open market at present. Mixed lots of hematite pigs are nominal at 50/ @ 51/ in usual proportions, and the West Coast makers' brands are:

	No. 1.	No. 2.	No. 3.
Cleator	55/	54/	53/
Lonsdale	52/	51/	50/
Workington	51/6	50/6	50/
Lowther	51/6	50/6	50/
Distington	51/6	50/6	50/
Harrington	51/6	50/6	50/
Solway	51/6	50/6	50/
Maryport	51/6	50/6	50/

The weekly output is now about 30,800 tons on the West Coast alone, not counting the productions of the Scotch, Cleveland and Welsh, &c., furnaces. Last week's West Coast shipments included 13,718 tons of pig iron and 5745 tons of rails.

THE CALCUTTA EXHIBITION.

I gather from a perusal of an editorial note in your London contemporary, the *Ironmonger*, that American manufacturers and exporters are likely to make a formidable presentation at the Indian International Exhibition, which will be opened at Calcutta in December next. The *Ironmonger* says: "It is somewhat early as yet to form opinions as to the relative proportions and merits of the different sections of the exhibition, but it is certain that the American exhibits will be particularly numerous and imposing. A strong contingent of 'drummers' and others from the United States will visit Calcutta and other Indian cities on the occasion, many of them having already secured their hotel accommodation. There will also be a large show from the Continent of Europe, particularly from Germany, France, Belgium, Italy and Austria, the consuls in India of those countries having taken the matter up with much spirit. Most of the Australasian Colonies will likewise be present in force. The Americans evidently mean to "go for" a share of Indian trade, of which they have virtually nothing at present, so far as hardware and machinery are in question. The Germans, for some time past, have competed with us in different parts of the Indian Empire in nails, garden implements, carpenter's tools, and cheap lines of cutlery, with a fair amount of success. The Indian market is peculiar in many respects, however, and is scarcely likely to change the conditions under which it is governed as a consequence of any one exhibition, although there is the probability that those who are present on this occasion will gain by their enterprise. We are asked to state that manufacturers should be careful to send out goods suitable for the Indian market, especially heavy articles, inasmuch as in the event of these remaining unsold at the close of the exhibition they would have to be sacrificed at auction, or sent back to England at considerable expense." *Verb. sap. sat.*

STATISTICS OF METALS.

The statistics—just issued—for the month of May I send in the belief that you would not receive them from any other source, and because they are doubtless interesting to your trade just now. *Copper.*—Furnished by Merton & Co., London:

	May 31, 1883.	May 31, 1882.	May 31, 1883.
Stocks in Europe:	Tons.	Tons.	Tons.
Liverpool and Swansea, Chili bars	24,290	21,007	28,725
Liverpool and Swansea, Chili ingots	444	1,115	393
Liverpool and Swansea, Chili ores and regulus (fine)	1,813	1,660	1,365
Liverpool and Swansea, other furnace stuff (fine)	3,128	2,226	1,945
London, foreign copper (chiefly Australian) and landing	4,791	8,398	8,839
France, Chili bars, ingots and Barilla	2,012	2,612	4,480
France, other copper	165	295	1,078
Total	36,803	37,313	47,027
Afloat and chartered from Chili to Europe:			
Advised by mail, ores and regulus (fine)	376	2,458	1,468
Advised by mail, bars and ingots	5,585	2,811	7,486
Advised by cable, ores and regulus (fine)	50	450	400
Advised by cable, bars and ingots	3,150	1,550	1,735
Total	45,964	44,582	58,116
Afloat from Australia to Europe:			
Advised by mail, fine copper	65	240	1,177
Advised by cable, fine copper	1,700	1,000	685
Total	47,729	45,822	59,978
Price of Chili bars, ℔ ton	£63. 15/	£68. 10/	£59

Tin.—A. Strauss & Co., London:

	April 30, 1883.	May 31, 1883.	May 31, 1882.	May 31, 1881.
	Tons.	Tons.	Tons.	Tons.
Straights and Australian, spot	5,178	5,890	7,894	8,358
Straights and Australian, landing	948	331	484	326
Straights, afloat	1,285	805	125	200
Australian, afloat	1,398	1,770	987	1,225
	8,809	8,796	9,490	10,109
Banca, on war'nts.	1,020	1,479	1,426	1,290
Billiton, spot	2,102	2,014	1,100	1,724
" afloat	1,309	1,055	854	650
Australian tin in Holland	7	4	79	.....
	13,237	13,348	12,949	13,773
Stocks in America, inc. quan. afloat	3,180	3,075	2,530	4,150
Total	16,417	16,423	15,479	17,923
Prices of Straits and Australian	£97. 0/	£95. 10/	£97. 10/	£88. 0/
Del'ries during the month, in Lond'n	1,360	1,297	1,342	1,037
Del'ries during th mon h in Holl'nd	753	438	512	673
Total	2,113	1,735	1,854	1,710

Tons

Shipments during the month from Straits to London	500
Shipments during the month from Australia to London	1200
Shipments during the month from London and Holland to America	385
Shipments during the month from Straits to America	275
Shipments during the month from Australia to America	100

	During 12 months, ending May 31.		
	1883.	1882.	1881.
Shipments from Straits to London	7,343	5,280	4,665
Shipments from Australia to London	9,167	8,930	8,832
Shipments from Straits to America	6,072	7,395	6,509
Shipments from Australia to America	1,763	1,177	828
Deliveries of tin in London	15,673	15,800	13,316
Deliveries of tin in London and Holland	22,071	23,640	21,244
Ditto, in London, Holland and U. S.	32 271	32,840	30,444

Banca in Trading Company's hands and afloat. 3387 tons.

	Prices.		Prices.
Straits or Australian, spot	£93. 10/	afloat	£96. 5/
English Common ingots	99. 0/	refined	101 0/
Banca	98. 0/	Billiton	96. 0/

FOREIGN.

BELGIUM.

(Moniteur Industriel.)

BRUSSELS, June 3, 1883.—*Iron.*—A remarkable degree of flatness still prevails in the Belgian Iron market, which seems incapable of casting off the bad impression produced by a lack of confidence. It must be confessed that there is a singular absence or scarcity of work, both in the Structural Iron branch and at the blast furnaces. At the great Government adjudication for furnishing the State railroads with freight cars, it is expected the tenders will run very low—indeed, much lower than they ran at the last opening of tenders. English Pig Iron is decidedly weak. Foundry Pig Iron is down to 5.75 @ 5.80 francs ℔ 100 kg. It is stated that a large sale has been concluded of Hematite Pig at a very low figure. Domestic Foundry Pig is still sustained at 7.25, but this price is not easily subscribed to. The Luxembourg group is resigned to accept 6 francs. Quite an unfavorable change has overcome the puddling Pig trade; stocks of this kind of Iron accumulate fast, causing the same to be freely offered. Common Pig has dropped to 4.75 @ 5.25. Finished Iron has been seriously affected in price. No. 1 Merchant cannot be quoted to-day any better than 12.50 francs, and it is even weak thereat: No. 2 goes not bring over 13.25, nor No. 3 more than 14. Beams maintain with difficulty the price of 13. Corners having given way to 13.50. Even Sheet Iron is at present neglected; No. 2 is currently low at 17; in some works No. 3 can be procured for 10 francs, and No. 4 is neglected at the low figure of 27. In no direction do we hear of much transpiring. This gives evidence of a precarious condition of affairs in our Iron trade, embarrassing in the extreme. *Coal*, on the contrary, is as firm as ever. The industrial demand remains active, while in consequence of the scarcity of mining hands production is unable to keep up an adequate supply. Good Bituminous sells at Charleroi at 18 @ 20 francs, and Industrial at 8.50 @ 12 francs.

GERMANY.

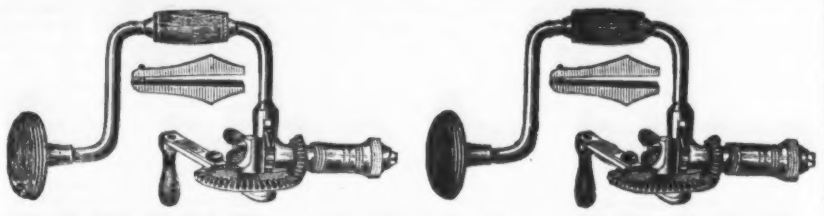
(Borsenhalle.)

HAMBURG, June 5, 1883.—*Iron.*—We look in vain for indications of a revival in the demand. Pig Iron is quite weak, Pudding Pig in particular, in the German Iron districts. Notwithstanding the early steps taken by the combined Siegen blast-furnace owners to counteract the drooping tendency by a lessened output, Pudding Pig has steadily declined in the district to 57, and Gray Westphalian Pig is with difficulty maintained at 59 marks ℔ ton. Competition for the sale of Finished Iron is very great among makers—so much so that, although there is a tolerably good demand for it, and Structural Iron in particular, prices are weak Meanwhile, Steel works continue very busy and have no cause for complaint. In Upper Silesia both Pig and Finished Iron remain inactive, the former at 58 marks; no shipments are made thence to Austria. In Lower Bavaria Gold and Silver discoveries have been made at Innernzell, in the Grafenau district, and at Zenting, in the Deggendorf district. From an analysis made it appears that the 100 kg. of dirt average 10 to 70 grams of Fine Silver and 2 to 10 grams of Fine Gold; at a depth of 4 to 5 yards the proportion of the precious metals seems to be on the increase in these layers of gneiss. These discoveries are looked upon as prospectively important to the Kingdom of Bavaria. *Metals.*—Lead is very quiet; we quote English Pig 14.50 @ 15 marks; Sheets, 15 @ 15.50; German, 13.25 @ 13.50, and Spanish, 16.50 @ 17. Copper is better; we quote Drontheim 72 @ 75; Calumet and Hecla, 80; Electrolytic N. A., 77 @ 78, and Refined English Ingots, 71 @ 72. Tin is dull; we quote Banca, Australian and English Common 105 @ 106, and Refined English 107 @ 108. Spelter is quiet; Silesian, spot and to arrive, 15.25 @ 15.75 marks ℔ 50 kg.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, June 3, 1883.—*Iron.*—There are still two different currents noticeable in the Austrian Iron trade. The one relates to Structural Iron in particular, and the other to Merchant Iron. In the first-named current, trade is so active that makers in many cases offer to indemnify contractors for delay in deliveries. This relates more especially to Beams. The second current alluded to is almost a stagnant one; it has reference to the paralysis noticeable in the Merchant Iron demand. This is all the more astonishing, as at this time of the year the demand usually is still quite brisk. Much of this dulness is no doubt due to the poor crop prospects in Hungary on the one hand, and Prussian competition on the other. Prussian Merchant Iron offering under 11 marks ℔ 100 kg. Dealers are well stocked from old contracts and are now compelled to compete with Iron offered very low to to consumers by small makers direct. Rolling mills in Austrian Silesia sell for less than 6.60 florins, while Styrian and Hungarian makers have not yet been demoralized to such a degree. We quote in this city, on a quiet market, Gray Pig, 53 @ 57 florins; for Gray the demand is the reverse of active at present; while Pig commands 51 @ 53; Bessemer, 57 @ 59; Styrian Merchant, 130 @ 134; Bohemian, 115 @ 120; Sheets for locksmiths, 180 @ 185; ditto for roofing, 190 @ 195; ditto for boilers, 175 @ 185; ditto for tanks, 170 @ 175, and Beams, 140 @ 145.



PATENT DRILL BRACE.

This is our regular No. 32 Ratchet Brace, with a Gear Wheel added to make it take the place of a Breast Drill.

This Wheel has Cut Gears and an extension Handle. It is speeded about four to one, and can be taken off in one second when not needed for drilling.

Thus we have, in one, a Breast Drill, Ratchet Brace and Common Stationary Brace.

The Brace is made of Steel, highly polished and heavily Nickel Plated, with Cocobola Handle and Lignumvitæ Head. It has two sets of Forged Steel Jaws, which will hold square and flat shank tools of all shapes and sizes, and round twist drills from 1-32 to 7-16 inch in diameter. The ratchet attachment enables the Brace to be used in places where there is not room to revolve the sweep.

Many attempts have been made to imitate the outside appearance of our Patent Barber Improved Bit Brace, but no one dares to use our Patent Jaws, as seen in this cut, and no Brace is good without them.

We began to make these Drill Braces six months ago, but after a few thousand were put on the market we made an improvement which doubled their value. While shifting on to the improved kind, we ran out of stock, but hope in future to fill orders in a reasonable time.

We shall advertise these Drill Braces enough to make an inquiry in all Hardware Stores for them. If any dealer lays in a stock and finds that they will not sell, we will take them back at full price. But they will sell wherever shown.

We have never made a more popular tool.

Discount same as on Breast Drills. Send for Catalogue.

MILLERS FALLS CO.,

74 Chambers Street, New York.

CHAMPLAIN

Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

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HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

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97 CHAMBERS AND 81 READE STREETS, NEW YORK.

DURRIE & McCARTY, Sole Agents.

THE RICHARDS HOUSE-DOOR HANGER

FOR SLIDING DOORS.

They are simple to hang, massive and strong, without a single weak point. Adaptable to all widths of doors from two to twelve feet, single or double, and require no track on the floor. The only absolutely anti-friction top hanger in the market. There are no plates to mortise in; no matching of hardware, and no defacing of doors. The trade are required to carry but one size in stock, the run being about forty inches longer than the largest sheave upon the market. Every set guaranteed. Write for quotations.

MANUFACTURED BY

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HARDWARE MANUFACTURERS,

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For Molasses, Oil, Japan, Varnish, &c.

UNQUESTIONABLY THE BEST

LEMON SQUEEZERS

IN THE MARKET ARE THE

Nos. 1, 2 and 3 "King" for

FAMILY, RESTAURANT AND HOTEL USE,

Send for descriptive circulars.

KYSER & REX,

(Variety Iron Works.)

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SOUND DEADENED

IN FLOORS AND WALLS OF

FACTORIES,

STORES,

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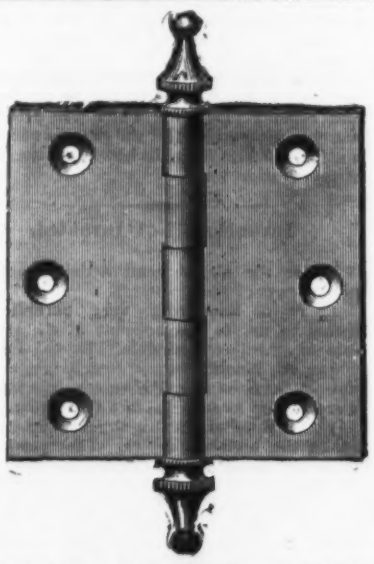
By the Fire-Proof Material Called Mineral Wool.

The POOREST CONDUCTOR of heat yet offered. CHEAP and DURABLE.

Sample and circular free by mail.

U. S. MINERAL WOOL CO.

22 Cortlandt St., New York.



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Polished and Plain Finish,

Manufactured and kept in stock by

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Manufacturers of

BRASS, GALVANIZED & SHIP CHANDLERY

HARDWARE,

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STANDARD SCALES

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Testing Machines.

Manufacturers of all descriptions of Testing Machines. Tests made daily.

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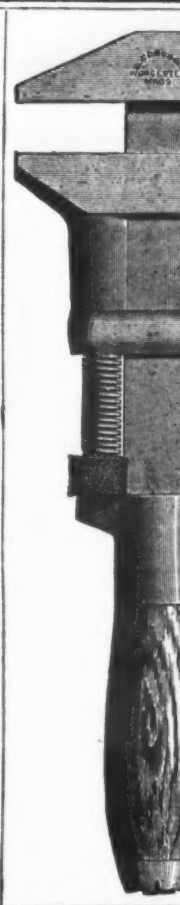

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Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.

Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

L. COES & CO.,

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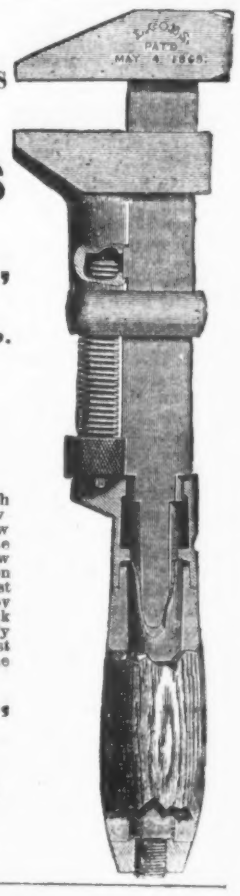
DURRIE & McCARTY,

Sole Agents.



1883.

PENNSYLVANIA

LAWN MOWER.

Has no Equal, Surpassing all others, and pronounced

"THE BEST."

For descriptive catalogue and prices write to

LLOYD, SUPPLEE & WALTON, Philadelphia.	LOCKWOOD, VANDOORN & TAYLOR, Cleveland.
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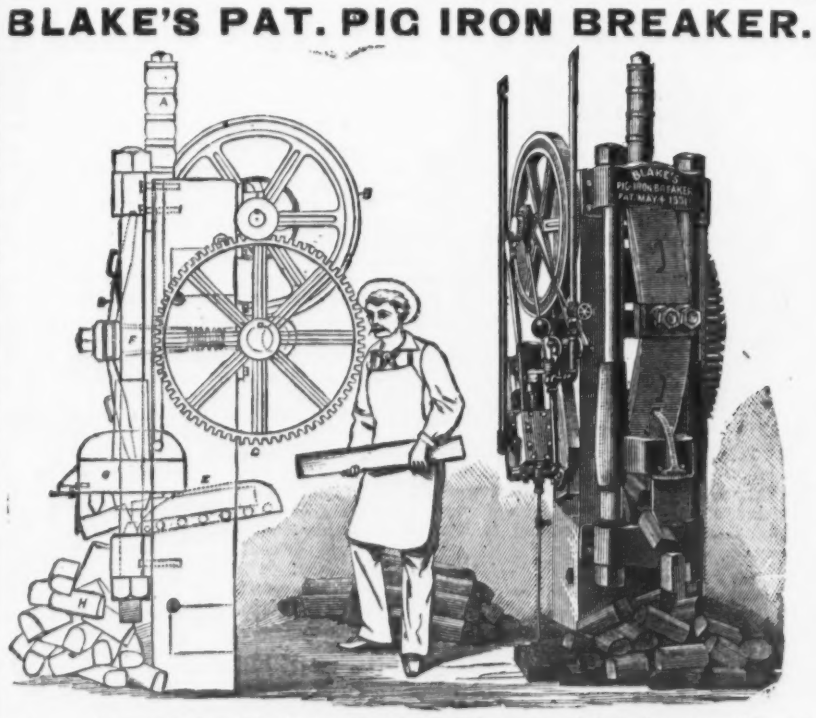
BLAKE'S PAT. PIG IRON BREAKER.



A new and successful machine for breaking pig iron into any length desired, with rapidity and economy. Besides saving in cost of breaking by hand, it secures the greatest economy in melting. Several machines already in use. Every machine guaranteed against breakage of parts. Requires but three horse-power. Can be run by belt or have small engine attached.

Send for Circulars, Prices, &c.

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Iron and Chain, Heavy and Wagon Hardware

RAILROAD & BUILDERS' SUPPLIES, &c.

ARTESIAN WELL MACHINES.

For our Full Page Advertisement, See First Issue of Each Month.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The foundry for the Shackelton Steam Heater, in South Lawrence, is being rapidly pushed toward completion.

CONNECTICUT.

An important consolidation of the Harvey Mfg. Co. and the Harvey Screw Co. has been effected, under the name of the Harvey Screw and Bolt Co., and extensive buildings are to be erected at Lime Rock before the close of the present year. The new company have a capital of $1,000,000, and have organized with the following officers: President, Wm. H. Barnum; vice-president, J. C. Howes; treasurer, Theodore Sturges; secretary, G. H. Nichols, Jr.; directors, Wm. H. Barnum, Connecticut; Percy R. Pyne, New York; B. G. Clarke, New York; Theo. Sturges, New York; J. C. Howes, New York; Milo B. Richardson, Connecticut; H. A. Harvey, New Jersey. The new company have purchased all the property and patents of the Harvey Screw Co. and of the Harvey Mfg. Co. The former have been manufacturing wood screws and the latter bolts. The new company will provide largely increased facilities for the manufacture of both screws and bolts, under the invention of Mr. H. A. Harvey for rolling threads. It is an extremely strong corporation, and the intention of the managers is to provide facilities for an immense production of screws, bolts and nuts.

PENNSYLVANIA.

The Altoona Rolling Mill will start up full handed this week.

Swedes Furnace, near Bridgeport, belonging to the Philadelphia and Reading Coal and Iron Co., is undergoing further repairs, with a view of commencing operations some time in the near future.

McIlvain & Son, of Reading, have started up their rolling mill double turn.

The Greenwood Rolling Mill, at Tamaqua, which suspended several months ago, on account of the failure of C. F. Schoener, of Philadelphia, and the Greenwood Rolling Mill Co., is being put in order by Messrs. D. A. Shepp and H. A. Weldy, who will start the mill on Monday next in the manufacture of bar and hoop iron.

Four companies have been organized in Pittsburgh, all presumably by the same parties, for the purpose of supplying the districts immediately around the city with natural gas for light and heat.

The Keystone Iron Works, at Reading, were to start up last Monday, after an idleness of nearly six months.

OHIO.

The furnace of the New York and Ohio Iron and Steel Co., at Ironton, has been banked up indefinitely.

The Table Glass Works, of Massillon, are now shipping on an average 600 packages of barrels of tableware per week. It is the intention of this company to add another department for the manufacture of cut glassware, which will be completed in the near future.

The Trumbull Iron Co., Girard, have shut down their works for an indefinite time.

The Ohio Smoke Consuming Co., Norwalk, have filed a notice of an increase of capital stock from $700,000 to $1,000,000.

The Canton Steam Heater Co. have elected directors and intend to commence building steam heaters very shortly.

J. L. Edwards & Co's rolling mill at Canal Dover was sold last week at assignees' sale to Reeves Bros., boiler makers, of Niles, for $14,000. Edwards's assignment occured about three months since, and was caused by the foreclosure of two mortgages, one of $8000, held by Vinton, Stout & Vinton, of Canal Dover, and the other of $6000, held by the Ward Iron Co., of Niles. The selling price is two-thirds of the appraisement, and just covers the mortgages.

The new steel company at Alliance hold a patent for a new process of steel casting which has been thoroughly tested and experimented with, and they will put in two 5-ton furnaces for present use, to be enlarged as required.

It is reported that Andrews & Hitchcock have been endeavoring to secure a lease of the Hall Iron Works, at Hubbard, but as yet have been unsuccessful.

The Sippo Valley Grass Co., Massillon, are running eight press shops and one blow shop. They are turning out first-class work, and have a number one set of workmen. All hands started on jellies and tumblers last week.

Pine Grove Furnace, at Hanging Rock, was blown in last week.

ILLINOIS.

The Chicago Hardware Mfg. Co. have taken possession of their entire factory building, a part of which has been heretofore occupied by the June Mfg. Co., and have added new machinery, tools and skilled labor. By these extensions their facilities are increased fully 50 per cent. Notwithstanding this and the fact that their foundry is being run to its fullest capacity, they are taxed to the utmost in their lock department to keep up with orders. One hundred and fifty men are now employed, and the company will place on the market, in time for the fall trade, a full line of butts. They have recently perfected a new office-door lock with an anti-friction latch.

The June Mfg. Co., of Chicago, are placing in their new works additional improved machinery, costing $10,000, and are behind on their orders.

Charles F. Elmes, of Chicago, has taken another contract to build 16 Harrison coal-mining machines.

WISCONSIN.

There are prospects of starting up the blast furnace near Fond-du-Lac during the present season. The furnace was erected some nine years ago, but has never been operated.

MICHIGAN.

The Jackson Iron Co. have decided to rebuild their furnace at Fayette, and work will be at once begun.

MISSOURI.

The Crystal Plate Glass Co., on account of a large supply of orders, will not close down their works on July 1, as is customary among glass makers, but will, on or about that date, put their new 16-pot Siemens gas furnace in operation, together with 24 additional ovens now building. These improvements will give the company a total of three furnaces, 48 pots, 70 annealing ovens, and a capacity of 5000 feet of polished plate glass per day. They report their sales for last month as a third larger than for the corresponding month last year. Among their important orders from New York City is one for glass for the 10-story office building now being erected by Mr. Cyrus W. Field.—*St. Louis Age of Steel.*

The St. Louis Stamping Co., of St. Louis, have erected and just occupied a two-story brick japannery, 40 feet in width by 92 feet in length. This new building, as a precaution against fires, is situated some 100 yards from the main works, and contains four improved drying ovens. The works of the company were only stopped four days by the late fire, and are now running full in all departments.

The Domestic Glass Industry.

Mr. Joseph D. Weeks, as Superintendent of the Department of Industrial Statistics of the Census Bureau, is now revising the proofs of his report on the manufacture of glass. The Pittsburgh *Dispatch* says:

It is the most complete statement of the glass manufacturing industries that was ever gotten up in this country, either by public or private enterprise. The statistics given are thorough and accurate, and classified in a manner that makes them doubly valuable. In addition to the statistics, there are chapters explaining the methods of manufacturing glass, and a complete history of glass manufacturing in the United States, from its origin up to the census year.

The investigations which form the basis of the report were confined exclusively to those works which manufacture glass from the crude material, or make the "metal," as it is termed, and do not include any statistics of those establishments in which manufactured glass is a raw material; or, in other words, the report only covers establishments in which glass is made, not those in which it is reworked, and does not, therefore, include statistics of manufactories of painted or stained glass, mirrors, chemists' ware, &c. In cases, however, where the glass is reworked in the same establishment in which it is made, the tables include the statistics of such reworking.

THE STATISTICS.

The total number of establishments in the census year was 211, with a total capital invested of $19,844,699, and the total value of the products was $21,154,571. In 1870 there were only 174 establishments, the increase during the 10 years being 37 per cent.; in employees, 57 per cent.; in capital invested, 44 per cent.; in wages paid, 20 per cent.; in material used, 36 per cent., and in value of product, 15 per cent. There were 34 works idle during the year, making a total number of pots idle of 349. During the census year there were building, but not completed, 4 window-glass works, 1 plate glass, 12 glassware and 5 green-glass establishments.

The fuel used in glass-making in the United States is chiefly coal, though at all the works more or less wood is used for various purposes, as also considerable petroleum and benzine for fire polishing, annealing and other like purposes. The total number of persons employed about the glass works of the United States during the census year was 24,177. Of those 17,778 were males above 16 years, 741 were females above 15 years, 5565 males under 16 years of age, and 92 females under 15 years. Many of the operations about glass works, especially in the packing and the gathering of the glass, are of such a character that they can be performed by women, children and youths. This is especially true of glassware, and, as is shown by the tables, 513 of the 714 females above 15 years and 3874 of the 5658 children and youths are employed in glassware manufactories, the larger proportion of the balance being employed in the manufacture of green glass, in which many of the operations are analogous to those of glassware.

Pennsylvania leads the list in value of product in the United States, having 41 per cent. of the entire production; New Jersey next, followed by New York and Ohio. Iowa is the lowest on the list, having only 2 per cent. of the total production. Allegheny County leads the list in the counties, having 26.79 per cent. of the total production of the country.

COMPOSITION OF GLASS.

Chapter II of the report is devoted to the composition, classification and properties of glass. The principal and essential constituents of glass are silica or sand, and an alkali, or sometimes a metallic oxide. The chief alkalies used are soda, lime and potash, and the chief oxide is that of lead. Other oxides, as those of zinc, tin and antimony, are sometimes used, and other materials, such as manganese, oxide of iron, arsenic, &c., are found in glass, but they are there as impurities or as materials used to correct impurities. While these are the chief constituents, and while it is impossible to indicate approximately the composition of the different kinds of glass, this composition, even in different specimens of the same kind, is by no means definite. The relative quantities of silica and the alkalies vary very greatly. Flint or lead glass, for example, is made harder or softer as the proportion of sand is increased or decreased. The crystal, flint glass and Strass of Ure's classification differ greatly in their properties, appearance and composition, but each is regarded as a silicate of potash and lead. In a word, while glass is considered a chemical compound, unlike most chemical compounds it has no fixed, definite composition in the several varieties. Indeed, although constant attempts have been made to produce as a commercial article a glass of that fixed definite composition that experience has shown to be the best for a given kind, but little success has been attained, except, perhaps, at times at the celebrated plate-glass works at Saint Gobain, France.

Chapter III is devoted to sand, the proportions used, the method of using, the localities from which it comes, &c. Sand for the Pittsburgh and Wheeling glass-houses comes from various points in the Allegheny Mountains, mainly from Juniata and Fayette counties, Pa., and Hancock County, W. Va. A new deposit is reported from the latter place, which, it is claimed, analyzes 99.90 per cent. of pure silica.

Chapter V is devoted to glass furnaces and pots, giving a description of those in use now and when the manufacture of glass was commenced, and noting the progress made in the way of improvements. The chapters in ancient and modern glass are especially interesting.

HISTORY OF GLASS-MAKING.

Chapter XII, giving a history of glass-making in the United States, contains much interesting information. The first glass-house was erected in the woods, about a mile from Jamestown, Va., and was built late in 1608 or early in 1609. Glass-making at that time was by no means well established in Europe. It is possible that the first glass-house in Virginia made bottles only. The craze for raising tobacco caused the glass house to fall into decay. At the time of the massacre, in 1622 this glass-house was destroyed. The first mention of glass works in Pennsylvania is found in a letter written in August, 1683, by Penn to the Society of Free Traders. In this letter he refers to the tannery, sawmill and glass-house. Where this glass-house was erected, and for what kind of glass it was intended, is not known; indeed, it is doubtful if the works were used for the purpose for which they were erected. From this time until just before the Revolution there is no record of glass working in Pennsylvania. On January 21, 1767, Governor John Penn wrote that a glass manufactory had been built in Lancaster County, 70 miles from Philadelphia, but did a very small business. The first glass works in Western Pennsylvania were built by Albert Gallatin at New Geneva, on the Monongahela River, in 1796. The Gallatin Works were used for the manufacture of window glass, and were very successful. In 1796 Major James O'Hara took preliminary steps toward erecting the first glass-house in Pittsburgh. It was not until June, 1797, that work was begun. It was at the south side of the Monongahela River, near the junction of the Allegheny River. The site, or part of it, has been continuously occupied as a glass-house ever since. This was one of the first, if not the first, works in the United States to use coal for fuel.

The first attempt to manufacture plate glass in the United States was made at Cheshire, Mass., about 1850. The attempt to make it a success was abandoned about 1856, principally because of the inferior quality of glass produced, very little of it being merchantable. The second effort was made at Lenox, Mass., in 1853.

In the historical part of the report there has been a great effort to secure accuracy, and copious foot-notes, which are attached not only give credit for the sources of information, but also indicate how great the labor of preparation was.

Inventions Not Invented.

Under the above head a daily contemporary says:

There is something very pathetic, it seems to us, in the account of the recent sale of "rejected models" by the Patent Office at Washington. Nearly 17,000 of these unsuccessful contrivances, it is stated, were put up at auction, like the flotsam and jetsam of numberless shipwrecks, and struck off to the highest bidders. They pertained to every branch of art and science, and represented an inconceivable expenditure of time and thought, of aspiration and patience. There were among them flying-machines, perpetual-motion mills, and all manner of what Hood used to call "alchemical pranks;" and in their queer, extravagant and vertiginous suggestions were to be read whole volumes of cheating dreams, of hope forever deferred, of halcyon calculations that ended in bitterness and heartbreak. It would be difficult to conjecture a more impressive and pitiful illustration of the manner in which fortune balks and defeats endeavor, and ridicules so much of man's pride and ambition.

The average price realized for these 17,000 uninvented inventions was 5 cents apiece—hardly the value of the raw material for firewood and fish-hook sinkers. And yet in many instances, it may be safely believed, years upon years of energy were expended in seeking for the lucky combination which would not be found, and, lacking which, all the rest was waste and mockery. Only a nickel to show for what may have been a lifetime of study, toil and self-sacrifice. It is a fortunate provision of nature that makes every would-be inventor a confirmed and unconditional optimist; otherwise men would soon cease their search after the secrets of things, knowing how likely it is that the cherished model will bring up at the auction-block and the junk shop, and be rated of no more worth than a frothy and passing mug of beer. Occasionally, to be sure, one of these baffled experimenters, worn out with disappointment and fatigue, gives it up and turns cynic and scoffer, but, as a rule, they persevere to the end, in spite of repeated failure, and die without relinquishing the notion that one more trial would have compassed success.

It is not to be expected that this auction sale of 17,000 rejected and superfluous models, significant as it is of the chances with which inventors have to contend, will check the inquiring spirit of our countrymen or reduce the number of those who are continually reaching forth for letters patent. Even those whose own lame and halting designs may have helped to make up the 17,000 souvenirs that went for 5 cents apiece will hardly be deterred from going on with their dreaming and concocting, hopeful as ever that they will hit it next time. The ordinary and uninventive observer cannot help admiring a confidence so arduously sunny, a loyalty to one's faith in one's self so absolute and unconquerable. However absurd and futile it may be, tried by practical standards, it is still not without its virtuous aspect. The man who seeks with all his might to invent something—be it only a mouse-trap, a button-fastener or a new method of stoppering a jug—is entitled to a certain respect for his earnestness and persistence, though we may be entirely satisfied that he is fooling away time that had much better be devoted to the manly art of raising corn and potatoes.

We cannot always know that what looks to be beyond invention is really a thing impossible. Too many cunning and confounding achievements have been wrought by the inventors, particularly of this country, to permit hasty judgment on any given scheme merely because it seems to the general eye chimerical and out of the question. We are enjoying too many advantages and conveniences resulting from victories of the inventive faculty to be justified in pooh-poohing further attempts in that direction on the sole ground that we cannot see how they are to be made successful. It must not be forgotten that it is still easy to remember when the grain-reaper, the sewing machine and the cylinder printing press were unknown and unguessed, and a prophecy of their coming in their present familiar and revolutionizing shapes would have been derided as the utmost stretch of a diseased imagination. The greatest of all modern forces, the railroad, is practically an invention, or a series of inventions, of the times in which we live—and even that, we know by later and separate wonders of ingenuity, did not exhaust the possibilities.

It becomes us, therefore, to exercise a wholesome self-restraint in the matter of disdaining or disparaging the inventions that are not yet invented, so to say. The spectacle of 17,000 useless models sold under the auctioneer's hammer at a nickel apiece is not a pleasant or triumphant one, of course, but, in another sense, it is proper to call it encouraging. The makers of models are not going to shrink back overcome and ashamed on account of this unique auction. More probably they will be spurred to closer and greater effort; and there is manifestly an abundance of them, or they could not have furnished so many as 17,000 models to be discarded, in addition to the other plentiful thousands that survived inspection and were declared patentable. They will move right on with their experiments and investigations, we may not doubt. There will be other and better models supplied. The missing links will be discovered in time, there is valid reason to apprehend, and we may be quite sure that among the things of heaven and earth that are not surmised in our daily philosophy, a great many will yet be made palpable to us in new surprises of inventive courage, skill and power. We can poorly afford, in the face of what has been done, to risk any definite predictions as to what may not still be done. It is better to wait and see. The inventors, like the rest of mankind, are entitled to a fair show. There is always another chance for other kinds of people, and they should have the same consideration. It will be time enough to laugh at their rejected models and discredit their postponed dreams when the models shall have ceased to be made and the dreams to be dreamed.

The English Cutlery Exhibition.

The Sheffield *Telegraph* says: Those who recollect the Cutlery Exhibition of 1879 will call to mind that it was an exhibition by employers of highly-finished specimens of the cutler's art, in which the skill of the workmen was not to any very great extent recognized. The present exhibition appears to have been effected by the growing demand for education, and especially technical education, and so far as the distribution of awards is concerned, only workmen are recognized. The result of this policy has been that there is an absence from the exhibition of show-cases containing goods of great beauty and finish which characterized the exhibition of four years ago, with two exceptions, the case shown by Messrs. Clarke & Sons, of Sheffield, and that shown by Messrs. Mappin & Webb. In the latter may be seen a great variety of carving knives and forks in cases, suitable for wedding presents, and an assortment of of general cutlery wares, pocket knives, sportsman's knives, fisherman's and settler's knives, picnic and champagne knives, cases of scissors in sets of from three to eight, and cases of lady's requisites, in a variety of materials including walnut wood, tortoise-shell, shark's skin, leather and mother-of-pearl. The general form of all these goods is too well known to need description.

It is perhaps the absence of any great number of attractive works of art which gives to the exhibition a certain flatness and poorness. From whatever cause, the visitors have been remarkably few in number. The exhibition is said not to have been sufficiently widely advertised, which is certainly a pity. One is not very greatly struck with the two wooden figures, indifferently clad in suits of armor of the time of the Protector, which in a manner may be said to guard the entrance to the hall, nor with the eccentric figure said to be a counterfeit presentment of a Japanese policeman, which meets the eye on entering. We venture to think that the delay in the publication of the awards must be peculiar to the city companies, for in connection with no other public bodies would it be tolerated. The London firms who are exhibitors of cutlery as distinct from their workmen are not more numerous than those from Sheffield. Messrs. Maw & Thompson are large exhibitors of surgical and dental appliances, which, as regards finish and workmanship, are certainly unsurpassed by anything in the exhibition. The Messrs. Wilkinson & Sons, of Pall Mall, sword makers, exhibit a case of arms, for the most part of regulation pattern, but containing, withal, a few very antique and curious weapons, representing such diverse nationalities as Egypt, Spain and India. It will be remembered that it was to the Messrs. Wilkinson that in 1879 was awarded the gold medal for excellence, while the freedom of the company was conferred upon Mr. John Latham, the chief partner of the firm. One side of the hall is enriched with screens, upon which are mounted suits of armor of old English and Indian workmanship, from the private collection of Mr. Latham, the Baron de Cosson, of Chertsey, Surrey, and the Worshipful Company of Armorers and Braziers. These are surrounded by swords, many of which, if old-fashioned, are of excellent workmanship, and some of which date back to the period when it was fashionable to use two hands in hewing a foe to pieces. The Baron de Cosson has a case also of rapiers, the hilts of which are of very curious and antique workmanship.

There are also some few non-competitive exhibitors from Sheffield connected with those trades which thrive and progress as the cutlery trade thrives and progresses. Of such is the carver of bone handles, and Mr. Edwin Brown shows some specimens of hafts and scales, polished and in the rough, in ox and horse bone, boxwood, ebony, rosewood, beech and barwood. Here may the uninitiated perceive how bone, indented by machinery and dyed, may be made to represent stag horn, and learn the various stages through which a haft passes before it becomes a polished and finished article. There is also a handsome stand containing the exhibits of Mr. F. W. Dover, of the Sycamore Tree Works, Rockingham street. These include bread plates and knives, butter coolers, cheese plates, biscuit boxes, crumb trays and brushes, teapot stands, egg trays, bread knives, &c. The goods are made of sycamore wood, and the carving alone is deserving of the attention of lovers of this form of art. Among other Sheffield exhibitors are Messrs. Francis Colley & Sons, who show a number of their leather driving bands, and a walrus hide for buffing table-knives, the value of which is estimated at £50; Mr. Wm. Godley, maker of dies for stamping blades; Mr. Henry Howe, Pond street, Sheffield, dealer in grindstones, who exhibits specimens of stones of various grit, including the Wickersley, Ackworth, Derbyshire and Thrybergh; Mr. Wm. Rowland, cutlers' tools and requisites, and Mr. Chester, of West street, who has a few specimens of Indian, German and Ceylonese stag for hafting. There appears to have been some difficulty as to the awards of the judges, who were as follows: For surgical instruments; Mr. Perry, of Brighton; Dr. Stouer, London, and Mr. Krohne, of the firm of Krohne & Seelman. For general cutlery, Mr. Franz Pigall and Mr. Charles Plum, London, and Mr. Wing, Sheffield.

We give below a list of awards, so far as they are at present known. There are still a few cases left undecided in the department of general cutlery. The awards in the surgical instrument department are for the present reserved:

Trade and Hunting Knife, &c., Mounters.—1st prize (for hunting knives), Wm. Judge, Park, Sheffield; 1st prize (for trade knives), Joseph Brammer, Trafalgar lane, Sheffield; 2d prize, H. Crammer, Church street, Stoke-Newington. 1st prize, Robert Richards, Brunswick Square, London.

Table Knife Grinders.—1st prize, George Henry Marshall, 81 Burns road, Crookesmoor, Sheffield; 3d prize, Hugh Elliott, 21 Sherrington road, Highfield, Sheffield.

Sword Grinders and Finishers.—1st prize, G. Thurkle, Soho, London.

Razor Forgers.—1st prize, Walter Wilde, 9 Shepherd street, Shalesmoor, Sheffield

Razor Mounters.—1st prize, Arthur Bingham, 3 Charlotte street, Sheffield.

Trade Knife and Hunting Knife Grinders.—1st prize, Walter Charles Harrop, 28 Fentonville street, Sheffield; 2d prize, William Mettam, Stratford; also to Alfred W. Turner, 55 Westfield Terrace, Sheffield.

Trade and Hunting Knife Forgers.—1st prize, William Judge, 127 South street, Park, Sheffield; 2d -prize, James Gill, 4 Union Buildings, Bridge street, Sheffield; also to Charles Jowitt, apprentice, Plaistow; 3d prize, Henry Jowett, 8 Maude street, Plaistow.

Artists' Knives.—1st prize, Henry Vickers, London.

Pocket and Pen Blade Grinders and Polishers.—1st prize, Henry Johnson, Sheffield; 1st prize also to Henry Packard, pocket-knife grinder (from Messrs. Lockwood Bros.); 2d prize, George Innocent, 183 Broomhall street, Sheffield; 2d prize also to Frank Pilkington, 165 Channing street, Walkley; 3d prize, Frank Smart, 102 Bombay street, Sheffield.

Spring Knife Cutlers.—1st prize not awarded; 2d prize, Joseph Heath, 17 Storm street, Lowfield, Sheffield; 3d prize, Jonathan Brammer, Monmouth street, Sheffield, for sportsman's knife; 3d prize also awarded to Jno. Wm Coombs (Messrs. Lockwood Bros.), apprentice.

Scale, Corkscrew, and Spring Forgers.—1st prize, Joseph Hartley (Messrs. Lockwood Bros.); 2nd prize, Stephen Jones, 7 Peel street, Broomhill, Sheffield; 3d prize, Thomas Pemberton, 16 Penn's road, Heeley, Sheffield.

Table Blade Forgers.—1st prize, Henry Sanderson, 103 Fitzwilliam street, Sheffield; 2d prize not awarded; 3d prize, Henry Saunders, London.

Pocket Blade Forgers.—1st prize (apprentice class), Walter Wm. Gee, 178 Alderson road, Sheffield; 2d prize, William Truelove (from Messrs. Lockwood Bros.)

Razor Grinders.—1st prize, W. Bisbey, Clough Place, St. Mary's road, Sheffield; 2d price, Samuel Sharp, 194 Barnsley road, Sheffield; 3d prize, Charles Kramm, Old street, Shoreditch; 3d prize, George Alfred Shaw, 571 Intake road, Sheffield (apprentice).

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NEW PUBLICATIONS.

PUMPS AND PUMPING MACHINERY. By Frederick Colyer, C. E. Published by Messrs. E. & F. W. Spon, London. Size, 5½ by 8¼ inches; 102 pages. Price, $5.

Mr. Colyer's work on "Pumps and Pumping Machinery," a copy of which has just come to hand, will be found to possess features of considerable interest and value. Perhaps the best idea as to the scope of the work and the arrangement of the matter treated of is given by the author in his introduction to Chapter I. Mr. Colyer here states that he did not consider it necessary to enter into a history as to the first use of the ordinary pump, lift and force pumps of the usual type for domestic supply now being so well known that no notice need be taken of them. Descriptions of machinery at work, derived in most cases from his own practice and experience, are given, and where any data are submitted, especially as to the performance of machinery of any kind, it should be understood that they may be taken in all cases as good average results, and not mere experiments. Dimensions are also given of the leading apparatus connected with pumping machinery and plant, as well as various types of engines and boilers, to indicate to those who have not had much experience in this class of work what they should specify in stating their wants. It is probable that the work may prevent in future, to some extent, the issue of the crude specifications and drawings that are too often seen, especially as they place contractors who tender for the work in an unfair position. Where so much is left to their own ideas, it necessarily follows that the tenders are very wide as to price. At the present time, when the lowest tender is usually accepted, it is necessary to have all the details of a proposed work clearly defined, especially as to the leading dimensions and way of finishing the work. The subjects considered in the work are pumps of various kinds for water and other purposes, engines, boilers and general machinery connected with pumping and water supply. In the class of steam and other special kinds of pumps, only those that have stood the test of good work, and that have come within the author's practice, are noticed. Several engines, pumps, &c., of a large class are described in detail, to give an idea of the dimensions of good types of work, which will undoubtedly be of much service in determining the requisite proportions for kindred works. All dimensions and particulars of this kind are from actual examples of good work. In treating of water pumping for the supply of towns, the distribution of the water beyond the works is entered into but slightly, as this is not within the scope of the book. Air pumps for various purposes are described in detail, both for exhausting and for charging vessels with air under pressure. Blowing engines for steel and iron works are also treated of, and examples and data of working results are given. The work contains 23 plates illustrating the subjects considered, and it is here that we meet with a highly objectionable feature. As is the case with many works on technical subjects, and especially those of foreign authors, the illustrations constitute the last pages of the book, and the inconvenience and annoyance arising from this source need scarcely be pointed out. We think that with but little difficulty some other arrangement might have been adopted—one by means of which the objection referred to would have been avoided, and which, instead of detracting, would have added to the otherwise attractive character of the work.

IRON ANALYSES RECORDS. By J. M. Sherrerd, M. E. Published by William H. Young, Troy, N. Y.

The above, which we received a short time since, will doubtless meet with much favor among metallurgists and all others having occasion to analyze ores and pig iron. As the name of the book implies, it offers all necessary facilities for preserving such analyses for easy reference, and about one-half of the book is devoted to ore, and the remaining portion to pig iron. The first two pages, moreover, are occupied by a table of symbols of the different chemical elements and their atomic weights according to both the old and new systems.

HOW TO MAKE PHOTOGRAPHS. A Manual for Amateurs. By T. C. Roche, edited by H. T. Anthony. Published by E. & H. T. Anthony & Co. Size, 5 x 7½ inches; 91 pages. Price, 50 cents.

In spite of the fact that numerous manuals of this kind have already been published, we think that the amateur will find this little handbook exceedingly useful, since it fills a place not taken by any other work of a similar character. Mr. Roche is well known as one of the most skillful photographers in the United States, and amateurs are probably as greatly indebted to him for personal instruction as to any other operator in the land. He therefore has the advantage of knowing very well what the amateur needs. The work opens with a description of the apparatus, and the chapter on lenses and cameras is one which contains a great deal of instruction, and answers the question which puzzles amateurs quite as much as any other, namely, What is the best lens for me to use? Illustrations are freely used throughout the work, and we notice that the novel camera especially designed for amateurs' use is very completely illustrated. Taken altogether, this seems to be the most desirable instrument that has yet been devised for the amateur, taking, as it does, pictures either vertical or horizontal, folding into an exceedingly small space, and having all the adjustments which the amateur is likely to need. The frontispiece consists of an instantaneous view of Broadway, printed on Anthony's glossy, rapid printing paper. Taken as a whole, this print is a marvel. Its beautiful, engraving-like tone and glossy surface, with the remarkable detail, both in the high lights and the shadows, all combine to render the picture a striking one. The figures on the foreground are rather more than an inch in hight. The hour of the day is near noon, when the street is crowded with traffic. The paper itself seems to be as near perfection as is possible, and is a remarkable advance on anything which has been seen before in this country for photographic work. The closing illustration is an ordinary photograph 3¼ by 4 inches, taken by a lady with one of Anthony's $10 outfits. It is a surprisingly good plate, and interesting as showing how good work can be done with a comparatively small outlay for apparatus.

The California Through Freight Rate Agreement.

The following is the full text of the agreement recently made between the Trunk Line Committee and the representatives of the Pacific roads, regarding the maintenance of rates on California traffic:

That the full established rates, tariff or contract, as the case may be, shall be maintained by all lines for all California business, both east-bound and west-bound, and that in case the commissioner of the Eastern trunk lines is satisfied that the thorough rates are cut via any line, upon request from him the companies parties to this agreement will use all legitimate means to enforce the maintenance of established rates. It is understood that the steamer lines from New York and other Atlantic seaboard points via New Orleans and Galveston may issue insured bills of lading at the same through rates as those made by the all-rail lines, but that no allowance shall be made shippers or consignees on account of insurance. All lines shall promptly furnish said commissioner with copies of their way bills for all their business covered by this agreement, and shall give any additional information or reports regarding said business that may be desired by the commissioner. This agreement shall take effect Monday, June 18, 1883, and remain in force until December 31, 1883.

Assistant Commissioner Guilford, in submitting the above agreement to the general managers of the various Western roads interested in this business, makes the following explanation:

"It became necessary to make this agreement, as the competition of the New Orleans route, which had been making whatever rates it pleased, threatened to monopolize the whole of the California business and take it away from the trunk lines and the Western roads. We are now pledged to the New Orleans and Galveston routes to see that the all-rail rates are maintained, as they will not be bound by the agreement if this is not done. Therefore we have to request all our Western connections, in whose interests the trunk lines have acted, to strictly maintain the established rates on all California business. Will you kindly inform me whether you will do so? We understand that there have been some competitive struggles for this business between your road and other Western roads. As far as the trunk lines can protect their various connections and remove all motive for rate-cutting, they will be glad to do so, and if you will inform us of your views and wishes in this matter, we shall use our best endeavors to conform to the same."

This plan shows that the trunk lines have become somewhat alarmed over the threats made by the Iowa lines that they do not mean to submit to the agreement unless a more equitable division of rates on California through business is made. Under the present arrangement, owing to the low contract rates made by the Central Pacific with those shippers who pledge themselves to ship exclusively by all rail, the remuneration of the Iowa lines for their share of the business barely covers the cost, and the latter lines seem to be determined to bring this matter to an issue, and will not be content with the "taffy" offered them by Assistant Commissioner Guilford. The Iowa lines are still of the opinion that the contract system injures everybody except the Pacific Road, and that it should be abolished and equal rates given to all shippers, whether they make contracts or not.

Haytian representatives in New York are trying to buy an iron steamer suitable for war purposes.

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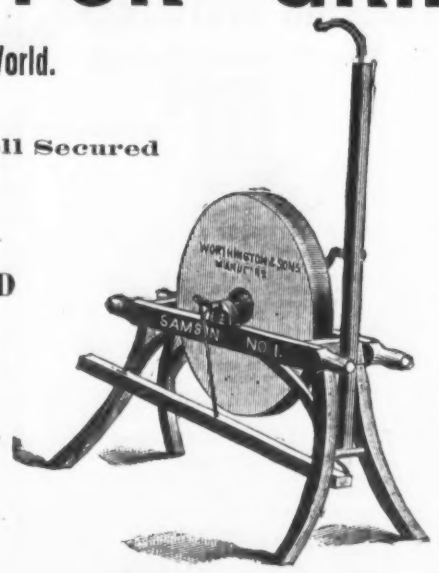

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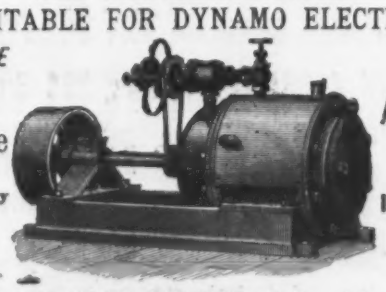

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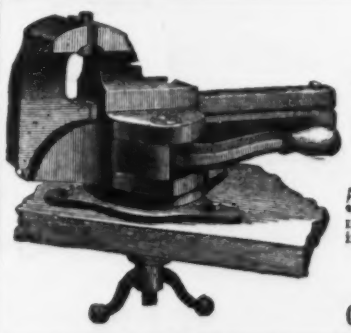

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It having come to our knowledge that Anvils of inferior make, and marked in a manner calculated to mislead buyers, are being sold as the "PETER WRIGHT" ANVIL, we beg to inform all buyers that all our Anvils are stamped on the side

PETER
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PATENT
SOLID
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and none are genuine unless they bear these marks. We also gum a green label on the other side of Anvil.

PETER WRIGHT & SONS.

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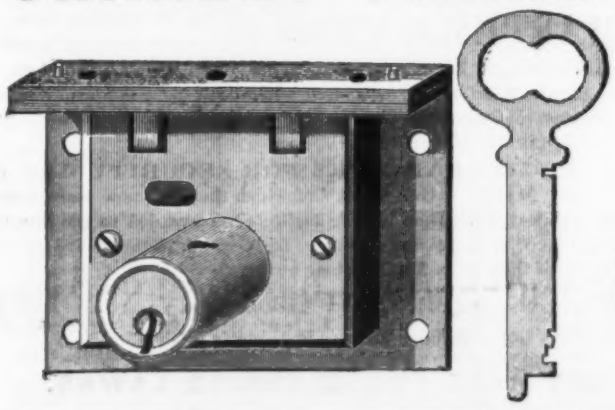

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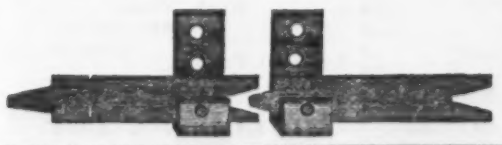

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The Improved Handle can be used upright at either end of the Saw, or inclined in either direction.

Richardson's Hand Saws are unequaled for Temper and Workmanship. Taper Ground. Thin at back. Perfectly true. We are also putting our **Red Frame Wood Saws** half-dozen in box, or put together, complete, in ordinary state, which way wanted. The finest in the market

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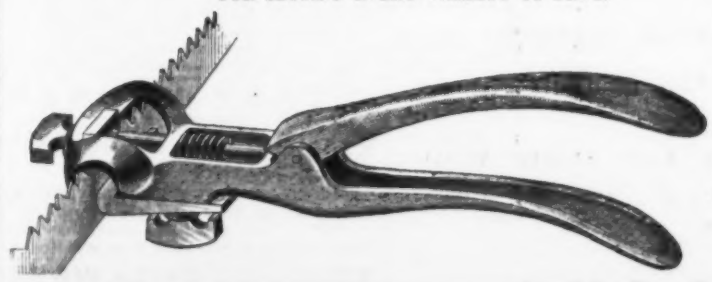

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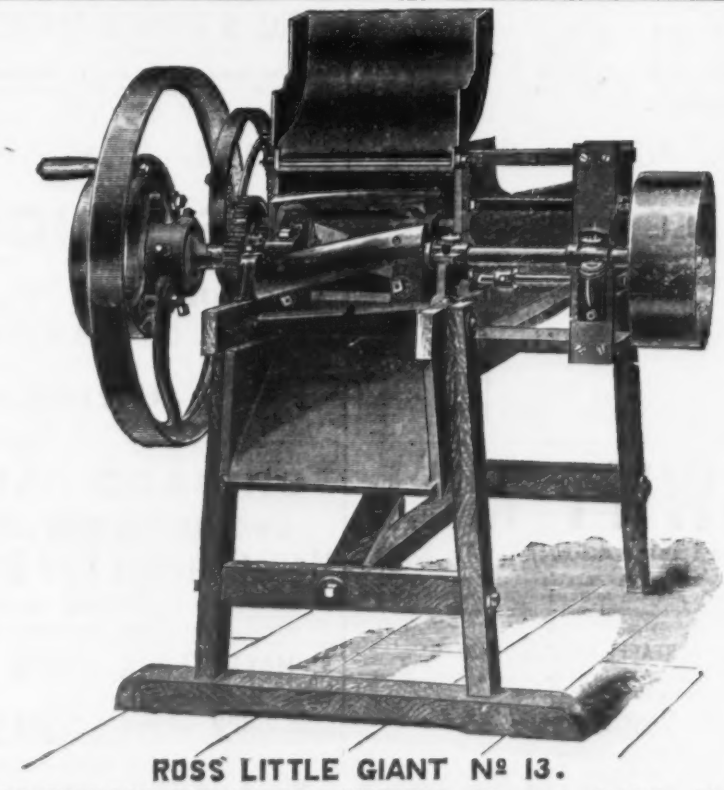

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The Iron Age Directory

and Index to Advertisements.

NEW YORK WHOLESALE PRICES, June 20, 1883.

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IRON.—DUTY. Bars, 1 to 1½c. ₩ lb. Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₩ lb: provided, that none of the above iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ lb; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 ₩ ton. Rail road, 70c. ₩ 100 lb. Boiler and Plate, 1¼c. ₩ lb

American Iron		
Foundry, No. IX	₩ ton	$20.00 @ 21.00
Foundry, No. 2X	₩ ton	18.00 @ 19.50
Gray Forge	₩ ton	17.50 @ 19.00
Scotch Iron.		
Eglinton	₩ ton	21.00 @ 21.50
Carnbroe	₩ ton	22.00
Coltness	₩ ton	24.25 @ 24.75
Shotts	₩ ton	24.00
Glengarnock	₩ ton	22.50 @ 23.00
Gartsherrie	₩ ton	24.00
Langloan	₩ ton	24.00
Summerlee	₩ ton	24.00
Rails.		
Steel at Eastern mills	₩ ton	38.00
Old Rails Ts		22.00 @ 23.00
Scrap.		
Wrought, ₩ ton, from ship and yard		23.00 @ 24.00
Bar Iron from Store.		
Common Iron		
⅜ to 1 in. round and square	₩ lb	2.10 @ 2.20c
1 to 6 in. x ⅜ to 1 in.	₩ lb	2.10 @ 2.20c
Refined Iron:		
⅜ to 2 in. round and square	₩ lb	$2.30 @ 2.40c
1 to 6 in. x ⅜ to 1 in.	₩ lb	2.30 @ 2.40c
1 to 6 in. x ¼ and 4-10	₩ lb	2.50 @ 2.60c
Rods—⅝ and 11-16 round and square	₩ lb	2.50 @ 2.60c
Bands—1 to 6 x 5-16 to No. 12	₩ lb	2.70 @ 30
Norway Nail Rods		4¼ @ 4½c

Sheet Iron.

	Common American	R. G. American.
Nos 10 to 20	₩ lb 3¼ @ 3½c	4½c
21 to 24	₩ lb 3½ @ 3¾c	4¾c
25 to 26	₩ lb 3¾ @ 4 c	5 c
27	₩ lb 4 @ 4¼c	5 c
28	₩ lb 4¼ @ 4½c	5¼c
	R. R.	28 qual.
Galvanized, 10 to 20	₩ lb 7½c	5½c
Galvanized, 21 to 24	₩ lb 7¾c	6 c
Galvanized, 25 to 26	₩ lb 8¼c	6¼c
Galvanized, 27	₩ lb 9 c	7 c
Galvanized, 28	₩ lb 9½c	7½c
Patent Planished	A ₩ lb 10½c	B. 9½c
Russia	₩ lb	@ 14c
American, Cold Rolled	₩ lb	c @ 7½c

COPPER.—DUTY: Pig, Bar and Ingot, 5c; Old Copper 4c ₩ lb. Manufactured (including all articles of which Copper is a component or chief value), 45 % ad valorem.

American Ingot ₩ lb See Trade Report.

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Braziers' Copper, ordinary sizes, 16 oz. per sq. ft., and over ₩ lb 26c

Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz. ₩ sq. ft. ₩ lb 28c

Braziers' Copper, 10 oz. and 12 oz., ₩ sq. ft. ₩ lb 30c

Braziers' Copper, Lighter than 10 oz. ₩ sq. ft. ₩ lb 32c

Circles less than 24 in. in diameter ₩ lb 28c

Circles 24 in. diameter and over ₩ lb 31c

Segment and Pattern Sheets ₩ lb 26c

Locomotive Fire Box Sheets ₩ lb 26c

Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 24c

Bolt Copper ₩ lb 26c

Copper Bottoms ₩ lb 31 @ 26c

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

Sheets, 14 x 48 ₩ sheet 8c

All other size Sheets, 23c ₩ sq. ft.

For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.—Net.

14x48.

14 and 16 oz. and heavier ₩ lb 37c By the case, ₩ lb 36c

12 oz. and lighter ₩ lb 40c ₩ lb 39c

Boiler Sizes.

7 in., 14x92. 8 in., 14x68. 9 in. 14x60.

14 and 16 oz. and heavier ₩ lb 39c By the case, ₩ lb 38c

(And all sizes not over 20 in. wide.)

24x48&30x60.

14 and 16 oz. and heavier ₩ lb 41c

oz ₩ lb 44c

SHEATHING METAL.

Yellow Sheathing metal ₩ lb 20 @ 22c

BRASS.

Brown & Sharp's Gauge the Standard for Metals. Old English Gauge the Standard for Wire.

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Cash prices for Roll and Sheet Brass. For less quantities than 100 lbs add 3c. ₩ lb.

HIGH BRASS.

All Nos. not thinner than No. 28, wider than 2 in., not wider than 14 in. 32c

All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive. 35c

All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive. 38c

1c. ₩ lb advance on each No. above Nos. 28 to 36, inclusive

All Brass thinner than No. 28 is Platers' Brass, at 43c

Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c

Printers' Rules 45c

Sheets wider than 30 in. and under 40 in. 47c

" 40 in. and over 50c

Circular Sheets, in diam. from 4 in. to 14, inclusive 42c

" over 14 " 20 " 45c

" " 20 " 30 " 49c

" " 30 " 40 " 55c

" " 40 in. 59c

LOW BRASS.

four cents ₩ lb more than High Brass

Gilding Metal, 8c ₩ lb more than High Brass.

Platers' or Gold Metal { In Bars 48c; Sawed 51c; Planed or Polished 54c

FOR SLITTING.

Metal, in width 1 in. to ¼ in. to No. 26, inclusive, 10 ₩ lb advance.

Metal, in width 2 in. to 1 in thinner than No. 28, 20 ₩ lb advance.

Metal, in width 1 in. to ⅛ in thinner than No. 28, 30 ₩ lb advance.

Metal in width ¼ in. to ¼, inclusive, not thinner than No. 28, 20 ₩ lb advance.

Metal in width ¼ in. to ¼ thinner than No. 28, 40 ₩ lb advance.

Metal, ¼ in. in width and less, 100 ₩ lb advance.

Any of the above widths cut to particular lengths, add 70 ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent., 12 inch to No. 26	$0.52	$0.75
5 " " "	.56	.76
6 " " "	.64	.86
8 " " "	.74	1.03
9 " " "	.87	1.12

German Silver Sheets over 12in. Wide and weighing more than 8 lb., 2c ₩ lb.

Advance 2c. for each additional inch in width above 12 in. and 2c. ₩ lb on each No. thinner than Nos. 26 to 2, inclusive.

All German Silver thinner that No. 36 is Platers', at 20c. ₩ lb additional.

German Silver Scrap, one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.33	$0.37	$0.40
No. 21	.36	.40	.46
No. 22	.37	.41	.47
No. 23	.38	.42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.53
No. 26	.45	.49	.55
No. 27	.48	.53	.60
No. 28	.52	.56	.63
No. 29	.55	.60	.68
No. 30	.62	.67	.72
No. 31	.65	.69	.74
No. 32	.68	.70	.74
No. 33	.70	.74	.83
No. 34	.74	.78	1.03

Spring Wire 2c ₩ lb advance

Flat Square and Half-Round Wire 5c ₩ lb advance on Round Wire.

Fancy Wire not less than 100 ₩ lb advance on Round Wire.

Brass Rods, No. 8 and larger, not less than 3 feet lengths, 36c.

Wire straightened and cut smaller than No. 8 and not less than 2 feet lengths, 43c.

Wire and Rods less than 2 feet lengths, special rates.

Twelve cents per lb extra for spooling on 1 lb spools No 36.

MISCELLANEOUS.

Brass Pail Ears	$0.50
Brass Door Rail	.45

SCRAP—Net.

High Brass Scrap	13c
Low Brass Scrap	14c
Gilding	10c

Turnings, Filings and Chips half the price of Scrap.

Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis. 30 %.

	₩ lb
Plain to No 20 inclusive above ¼ in. to 3 in.	$0.47
Plain above 3 in.	.52

Nos. 21, 22, 23, two cents advance on List for each Number.

Nos. 24, 25, 26, four cents advance on List for each Number.

Above No. 26, special rates.

Plain, ⅛ inch	70
Plain, 3-16 inch	1.10
Plain, ¼ inch	1.00

All Plain Drawn Tubes 5 cents advance on List Prices.

Fancy Tubing to No. 26 60

English, Scotch and Extra Patterns Fancy Tubing 40

Tubing Sawed or Cut 8 to 4 feet long, 5 cents advance on List

Add two cents, ⅛ cent for each additional cutting under 2 feet

All Mandrel Drawn Tubes under ⅝ in. 25 cents per pound advance.

ZINC TUBING—dis. 25 %.

Plain	37
Fancy	33
Scotch and Extra Patterns	36

GERMAN SILVER TUBING.—dis 25 %.

4 Per cent.	80
6 Per cent.	.90
9 Per cent.	1.00
12 Per cent.	1.20
15 Per cent.	1.35
16 Per cent.	1.45
18 Per cent.	1.40
20 Per cent.	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils, valued at 7c ₩ lb, or under, 2½c; over 7c and not above 11, 3c ₩ lb; over 11, 3½c ₩ lb, and 10 % ad val. Railway Bars, 1¼c ₩ lb. Railway Bars, in part Steel, 2c ₩ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.

Best Cast	₩ lb 15½c
Extra Cast	₩ lb 16½c
Circular Saw Plates	₩ lb 18c
Round Machinery, Cast	₩ lb 10c
Swaged, Cast	₩ lb 18c
Best Double Shear	₩ lb 15½c
Blister, 1st quality	₩ lb 13c
German Steel, Best	₩ lb 11c
2d quality	₩ lb 10c
3d quality	₩ lb 9c
Sheet Cast Steel, 1st quality	₩ lb 15½c
2d quality	₩ lb 14½c
3d quality	₩ lb 12½c

ANTIMONY See Trade Report

LEAD.—DUTY: Pig, $2 ₩ 100 lb Old Lead, 1½c ₩ lb Pipe and Sheet, 2½c ₩ lb.

American	4.65 @ 4.70c
Bar	.6c
Pipe	6¼c, dis 10 %
Tin Lined Pipe	11c, dis 10 %
Sheet	7½c, dis 10 %
Shot	Drop 7c, Buck. 8c
Chilled Shot	8c

BABBITT METAL.

N. P. U.	₩ lb 8c
A. 280 B. 250 C. 15c	

TIN.—DUTY Plates, Sheets Tagger and Terne, 1.10 ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs free. Banca, subject to dutv of 10 per cent.

Banca	₩ lb 23½c
Straits	₩ lb 23½c
English	₩ lb 23 c

TIN PLATES.

I C 10X14 } I C 14X20 } Prime Charcoal	$6.25 @ 6.75
Second quality	$5.87½ @ 6.25
I C 12X12 Prime Charcoal	6.50
I X 10X14 } I X 14X20 } Prime Charcoal	7.75 @ 8.00
Second quality	$7.25 @ 7.50
I X 12X12. Prime Charcoal	6.25
D C 12½X17, Prime Charcoal	5.75
D X 12½X17, Prime Charcoal	7.25
For each additional X add	1.50

COKE TIN PLATE.

	Best.	Ordinary.
I C 10X14 } I C 14X20 }	$4.50	$4.15 @ 4.40
I C 12X12	5.75	5.40 @ 5.50

TERNE PLATE.

	Prime Char.	2d Qual.	Coke.
I C 14X20	$4.50 @ 5.62½	5.25	5.12½
I X 14X20	7.00	....	....
I C 20X28	10.75 @ 11.25	10.50	10.00 @ 10.25
I X 20X28	14.00	....	....
I C 20X200	14.00	....	....
I C 14X20 M. F. Brand			$7.75

SOLDER—⅛ & ⅙ 15c

Extra 13½c

No. 1 12 c

SPELTER.—DUTY: In Pigs, Bars and Plates, $1.50 ₩ 100 lb.

American, cash	5.00 @ 5.25

ZINC.—DUTY Pig or Block, $1.50 ₩ 100 lb: Sheet 2½c ₩ lb.

Sheet, Cask	6¼ @ 6½c
Sheet, Open	6¼ @ 7c

Paper Stock, &c.

(Dealers' Selling Prices.)

	Cents ₩ lb.
White Shirt Cuttings, No. 1	6¼ @ 7
White Shirt Cuttings, No. 2	4 @ 4¼
Mill Assorted Whites	3¼ @ 3½
Unbleached Muslins	3¼ @ 3½
City Whites, No. 1	4½ @ 4¾
New Canton Flannels	3 @ 3¼
New Seconds, light	3¼ @ 3½
New Seconds, dark	2¾ @ 3
No. 2 Whites	3 @ 3⅛
Cotton Canvas	4½ @ 4¾
Linen Canvas, No. 1	4¼ @ 4½
Seconds, City No. 1	1¾ @ 1¾
Seconds, City No. 2	1¾ @ 1¾
Colors, per cwt	70 @ 80
Manila Rope	3¾ @ 4
Manila Rope, Tarred	2¾ @ 3
Gunny Bagging, No. 1	2 @ 2¼
Gunny Bagging, No. 2	1¾ @ 2
Kentucky Bagging	4½ @ 4¾
Burlap Bagging, No. 1	3¼ @ 3½
Tar Shakings	2 @ 2¼
Hemp Twine Stock	4½ @ 4¾
Hard White Shavings, No. 1	4 @ 4¼
Soft White Shavings, No. 1	3¼ @ 3½
White Shavings, No. 2, soft	3 @ 3
Mixed Shavings, part white	2½ @ 3
Ledger and Writing	3 @ 3¼
Solid Stock	2½ @ 2¾
Book Stock, No. 1, light	1¾ @ 1¾
Old Newspapers	1¼ @ 1⅜
Pure Manilas	2¾ @ 3
Bogus Manilas and Hardwares	⅞ @ 1
Commons per 100 lbs	60 @ 70
Binders' Board Cuttings	⅞ @ 1
Straw Board Cuttings per cwt	75 @ 80

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb 22 @ 24c
Black Lamp, Ordinary	₩ lb 0c
Black Ivory Drop, fair	12 @ 15c
Black Ivory Drop, best	23c
Black Paint, in oil kegs 8c; asst'd cans, 11c	
Blue Prussian, fair to best	40 @ 55c
Blue Prussian, fair to best, in oil	45 @ 55c
Blue Chinese dry	70c
Blue Ultramarine	18 @ 30c
Brown, Spanish	1½c
Brown, Van Dyke	10 @ 12c
Green, Chrome	15 @ 25c
Green, Chrome, in oil	14 @ 18 @ 25c
Green, Paris good, 20c; best, 25c	
Green, Paris, in oil good, 30c; best, 45c	
Iron Paint, Bright Red	₩ lb 2½c
Iron Paint, Brown	₩ lb 1½c
Iron Paint, Purple	₩ lb 3 c
Iron Paint, Ground in oil, Bright Red	₩ lb 6½c
Iron Paint, Ground in oil, Red	₩ lb 6½c
Iron Paint, Ground in oil, Brown	₩ lb 6½c
Iron Paint, Ground in oil, Purple	₩ lb 6 c
Mineral Paints	2 @ 4c
Orange Mineral	18c
Red Lead, American	7c
Red Venetian (Eng.) dry	$1.65 @ $1.70
Red Venetian, in oil asst'd cans, 11c; kegs, 8c	
Red Indian dry	9 @ 12c
Rose Pink	10 @ 13c
Sienna, American, Raw, powdered	4c
Sienna, Burnt, powdered	4½c
Sienna, Burnt, in oil	10 @ 16 @ 20c
Sienna, Raw	11 @ 15 @ 24c
Umber, Burnt, powdered	4 @ 8c
Umber, Burnt, in oil	9 @ 12 @ 18c
Umber Raw, powdered	3½ @ 7½c
Umber, Raw, in oil	10 @ 16 @ 40c
Vermilion, Chinese	90c
Vermilion, English	46 @ 48c
Vermilion American, Common	14c
White Lead, American, pure dry	6½ @ 6¾c
White Lead, American, pure in oil	8½ @ 9c
White Lead, American, prime in bbls. 2 @ 2½c	
Yellow Ochre, French	$1.75
Yellow Ochre, French, in oil asst'd cans, 11c; kegs, 8c	
Yellow Ochre, Vermont In casks, 1½c	
Yellow Chrome	17 @ 37c
Yellow Chrome, in oil	14 @ 18 @ 24c
Zinc White, American No. 1, dry	7 @ 8c
Zinc White, American No. 1, in oil	9c
Zinc White, French (Paris) dry	9 @ 10c
Zinc White, French, in oil	10 @ 11c

Oils.

Linseed Raw, in casks and bbls	49c @ 49c
Linseed Boiled, in casks and bbls	49c @ 50c
Linseed, Calcutta	48 @ 49c
Bleached Whale	₩ gal. 95c
Bleached Sperm	₩ gal. $1.34
Bleached Elephant	7 @ 8c
Signal	80c
Prime Lard	66c
No. 1 Extra	78c
West Virginia	85 @ 100
Drilling	40c
Miners' Oil	47c @ 49c
Fish Oil, pressed	480 @ 500
Neatsfoot	75 @ 80c
Tallow	7c @ 7½c
Empire Cylinder Oil	64c
Machinery	40c
Engine	40c

Sundries.

Asphaltum Cuban	4c @ 8c
Asphaltum Egyptian	8½c @ 9c
Benzine	₩ gal. 9 @ 11c
Chalk	80c
Chalk, Block	90c
Dryer, s Patent Am'n asst'd cans, 60; kegs 3c	
Frostings	4c
Glue, White	24 @ 35c
Glue, Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	36c
Gum, Damar	24c
Gum Shellac, English	40c
Gum Shellac, English, dark	33c
Litharge	7½c
Mineral Wool, ordinary	₩ lb 1 @ 1½c
Mineral Wool, extra	₩ lb 3 @ 3½c
Pumice Stone, selected Lumps	4 @ 5c
Pumice Stone, Powdered	2½c
Pine Tar, bois	$2.75
Pitch	$1.90
Putty, in bladders	3c
Putty, in bulk	2½c
Rosin—Common and Good—Strained	$1.00
E & F	$2.10 @ $2.20
G & H	$2.30 @ $2.50
I & K	$2.60 @ $2.80
M & N	$3.00 @ $3.25
Spirits Turpentine	38½ @ 39½c
Whiting Spanish	2c
Waste, No. 1 Cop	10c
Waste, No. 1 White Machine	10c
Waste, No. 2 White Machine	9½c
Waste, No. 1 Colored	7c
Waste, No. 2 Colored	6½c
Waste, Washed Machine	c

Glass.

Prices current per box of 50 feet. List, January 17, 1882.

Single Thick.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$10.00	$ 9.25	$ 9.00	$ 8.4
11 x 14 to 16 x 24	11.90	10.75	10.25	9.4
18 x 22 to 20 x 30	14.75	13.75	12.50	11.4
15 x 36 to 24 x 30	16.50	14.75	13.00	
26 x 28 to 24 x 36	17.50	16.00	14.00	
26 x 36 to 26 x 44	18.75	17.25	14.40	
26 x 46 to 30 x 50	20.40	19.25	16.50	
30 x 42 to 30 x 54	22.75	21.00	18.00	
30 x 56 to 34 x 5	24.00	22.00	19.75	
34 x 48 to 34 x 60	25.25	23.5	21.40	
36 x 60 to 40 x 60	28.40	26.00	23.75	

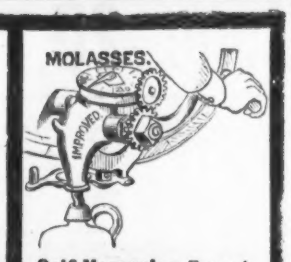
Double Thick.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$13.00	$12.25	$11.75	$11.0
11 x 14 to 16 x 24	15.75	14.75	14.00	
18 x 22 to 20 x 30	20.00	18.50	17.00	
15 x 36 to 24 x 30	22.00	20.00	17.75	
26 x 28 to 24 x 36	24.00	22.40	19.25	
26 x 36 to 26 x 44	26.00	23.50	20.00	
26 x 46 to 30 x 50	27.00	25.25	22.00	
30 x 42 to 30 x 54	30.00	28.00	24.00	
30 x 56 to 34 x 60	31.50	29.00	26.25	
34 x 48 to 34 x 60	33.00	31.40	28.50	
36 x 60 to 40 x 60	37.00	34.00	32.00	

Sizes above—$15 per box extra for every 5 inches. An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches will be charged in the 81 united inches bracket. Discount, 70.


Fruit, Wine & Jelly Press.


SAUSAGE STUFFER.



Self-Measuring Faucet.

NO. 20 COFFEE MILL.

ENTERPRISE MANUFACTURING CO. OF PA.,
THIRD & DAUPHIN STS, PHILADELPHIA, PA.

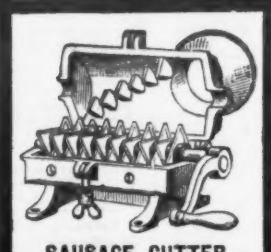

MRS. POTTS'
Cold Handle Double Pointed Sad Irons.

Tincture Presses,
Self-Weighing
Cheese Knife,
Cork Presses.

THE BEST
ARE THE
CHEAPEST.

SOLD BY HARDWARE DEALERS.
SEND FOR ILLUSTRATED CATALOGUE, FREE.


Smoked Beef Shaver.


SAUSAGE CUTTER.


Bung Hole Borer.

Tobacco & Root Cutter.

THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

AND

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES: New Britain, Connecticut.

WAREHOUSE: 79 Chambers St., New York.

Bemis & Call Hardware & Tool Co.

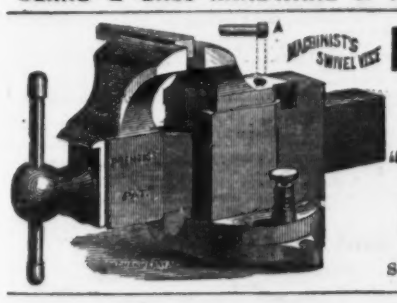
This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.



PRENTISS' PAT. VISES,

Adjustable Jaw.

Stationary or Pat. Swivel Bottoms.

ADAPTED TO ALL KINDS OF VISE WORK. ALSO

"PEERLESS" SWIVEL PIPE GRIP

FITS ANY VISE. SOLD BY THE TRADE.

PRENTISS VISE CO.,

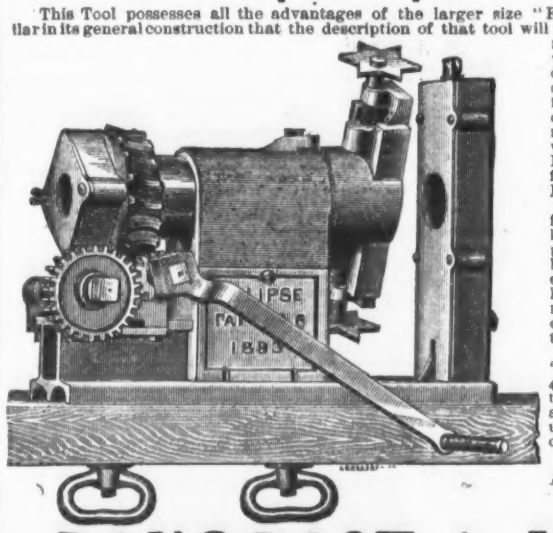
23 Dey Street, New York.

SOLE PROPRIETORS. SEND FOR CIRCULAR.

THE

"Junior" Eclipse Pipe-Cutting Machine

This Tool possesses all the advantages of the larger size "Eclipse" Machine, and is so similar in its general construction that the description of that tool will serve for the "Junior" also. It meets the requirements of those who have use for a Screwing Machine light enough to be readily carried about, sufficiently powerful in its gearing (18 to 1) to work easily, and strong enough to bear rough usage. All of these points, with the very important one of MODERATE COST, are to be found in the **"Junior" Eclipse Machine.**



It will cut off and thread Pipes from ⅛ to 2-inch, inclusive; can be erected on any fence, box or plank in five minutes by simply boring two ⅜ holes, and weighs, complete, about 125 pounds. It has no complicated parts and nothing to break or get out of order, and will do the work of a tool costing twice its price.

We offer it, as also the large size "Eclipse" (cutting pipes 2½ to 4 inch), with the understanding that if not found satisfactory after a fair trial it may be returned to us within thirty days and the purchase money will be refunded.

PRICE, Complete with Dies 1-4 to 2 inches, $60.

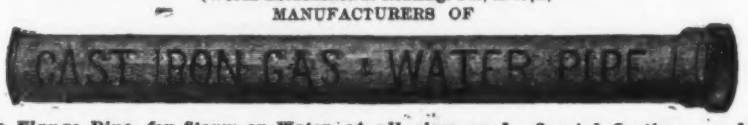
PANCOAST & MAULE,

243 & 245 So. Third St., PHILADELPHIA.

MELLERT FOUNDRY & MACHINE CO., LIMITED.

(Works Established at Reading, Pa., in 1848.)

MANUFACTURERS OF



Also Flange Pipe, for Steam or Water, of all sizes used. Special Castings, such as Branches, Bends, Reducers, Sleeves, &c. Stop Valves, Fire Hydrants, Retorts, Lamp Posts, &c.

The Improved Canada Turbine Water Wheel.

MACHINERY AND CASTINGS FOR

Furnaces, Rolling Mills, Mining Pumps, Hoists, &c.

CAR CASTINGS, GIRDERS, COLUMNS, BRACKETS, IRON RAILING, &c., &c.

GENERAL OFFICE AT READING, PA.

ROOF CRESTING AND FINIALS,

Weather Vanes, Tower Ornaments, &c.

WROUGHT IRON FENCES,

Iron Shutters, Window Guards, Jail Work, &c.,

BANK AND OFFICE RAILINGS,

WIRE and IRON WORK of Every Description.

☞ Send for Catalogue stating your wants, and we will make estimate. Mention this paper.

THE E. T. BARNUM WIRE & IRON WORKS,

Detroit, Mich., U. S. A.

Henderson's Patent Gas Furnace,

Realizes Perfect Utilization of Coal as Fuel,

PRODUCES INGOT IRON FREE OF CARBON and

INGOT STEEL OF ALL GRADES OF CARBON,

From every kind of Pig Iron or Pig and Wrought Scrap Iron.

Apply to JAMES HENDERSON,

BELLEFONTE, CENTRE CO., PA.

THE CLARK MF'G CO. MANUFACTURERS OF BUILDERS' HARDWARE BUFFALO, N.Y.

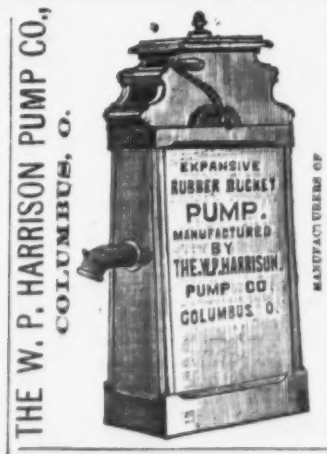
CHAMPION
HOG RINGER
RINGS and HOLDER.
Only double Ring ever invented. The only Ring that will effectually keep Hogs from rooting. No sharp points in the nose.


EAGLE BILL
CORN HUSKER
is the best Husker in the market. Farmers say it is the best. Use no other.

BROWN'S
HOG AND PIG
RINGER and RINGS.
Only single Ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

Ringers 75c. Rings, 40c. 100. Holders, 75c. Huskers, 15c.

CHAMBERS, BERING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.



THE W. P. HARRISON PUMP CO., COLUMBUS, O.

MANUFACTURERS OF

Superior Expansive Rubber Buckets (our own patents), also Curbs, Castings, Chains, Tubing, &c.

Agents Wanted throughout the United States.

THE BOLTON STEEL CO.,

MANUFACTURERS OF

THE BEST REFINED

TOOL STEEL

AND OTHER FINE GRADES OF

CAST STEEL.

CANTON STEEL WORKS,

CANTON, OHIO,

PERFECTION WINDOW CLEANER.

Simple, Useful & Durable.

Saves 75 per cent. in time and labor over any other method.

This is the only perfect Glass and Window Cleaner yet devised. It has

TWO RUBBER STRIPS,

One an elastic cleaning edge, the other a yielding cushion or support. Has hollow iron handles to attach to pole.

We own all the Patents

embracing **any or all** of these principles, and shall prosecute parties found infringing, either by manufacture or sale of any other **Rubber Window Cleaner.**

Buy only the PERFECTION,

and you escape all infringements. See that our stamp and dates of patents are on every cleaner.

PERFECTION WINDOW CLEANER CO.,

232 La Salle St., CHICAGO, ILL.

UNION BOLT AND NUT WORKS.

THOMAS PARKES,

MANUFACTURER OF

MACHINE BOLTS, NUTS AND RIVETS

Of All Kinds.

Office and Works,

204 206 & 208 Chicago St., BUFFALO, N. Y.

HAMMOND'S Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.

W. S. HAMMOND,
Lewisberry, York Co., Pa.
Circulars give full instructions.

Grindstones, Emery, &c.

Walter R. Wood GRINDSTONES.

Berea, O., Nova Scotia, & other brands.

283 and 285 Front Street, New York.

GEO. CHASE,

The largest manufacturers in the world of

OIL STONE

Of all description.

107th Street and Harlem River,

Send for Illustrated Price List. NEW YORK.

OHIO GRINDSTONE COMPANY

JAMES NICHOLL, Prest. L. P. HALDEMAN, Secy.
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Manufacturers of

GRINDSTONES

Of All Kinds.

127 Superior Street,

CLEVELAND, OHIO,

New York Wholesale Prices, June 20, 1883.

HARDWARE.

Anvils.
Eagle Anvils American....... ℘ ℔ 10c—dis 20 %
Wright's.....11c @ 11½c
Armitage's Mouse Hole.....9½c @ 9¾c
Armitage's Mouse Hole (extra quality).....11½
Trenton.....10½c
Wilkinson's.....10½c

Anvil Vise and Drill.
Millers Falls Co., $18.00.....dis 20 %
Cheney Anvil and Vise.....dis 33⅓ %

Augers and Bits.
Conn. Valley Mfg. Co. / Douglass Mfg. Co. / C. E. Jennings & Co. / Humphreysville Mfg. Co. / Ives / Beecher (French, Swift & Co.) / Griswold / Nobles Mfg. Co. / Snell Mfg. } dis 45&10 % from list of Jan. 7, 1880.
Watrous & Co. Extension Lip.....dis 35 %
Cook's Douglass Mfg. Co.....dis 40&10 %
Patent Solid Head.....dis 30 %
Lewis' Patent Single Twist.....dis 45 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand Rail bits.....dis 10&10&10 %
Russell Jennings' Augers.....dis 16⅔&10&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers.....dis 25&10&10&10 %
Imitation Jennings' Bits.....dis 50 %
Ives' "Jennings'" Bits.....dis 40&10 %
Snell Mfg. Co.'s Jennings' Bits.....dis 40 %
Expansive Bits, Clark's, small, $18; large, $26..dis 25 %
Expansive Bits, Ives'.....$20 @ $30—dis 33⅓&10 %
Expansive Bits, Blake's.....$20—dis 40 %
Expansive Bits, Derby, $17 and $26.....dis 40 %
Hollow Augers, Ives / Hollow Augers, French, Swift & Co. } dis 25 %
Hollow Augers, Douglass'.....25 %
Hollow Augers, Bonney's Adjust. ℘ dz. $48—dis 25&10 %
Hollow Augers, Stearns' Adjust. ℘ dz. $48—dis 20&10 %
Hollow Augers, Ives' Expansive, each $4.50—dis 30&10 %
Hollow Augers, Universal Expan., each $4.50—dis 20 %
Wood's.....dis 25 %
Gimlet Bits.....$7.50 ℘ gross, dis 50 %
Gimlet Bits, Diamond.....℘ doz. $1.10, dis 25&10 %
Gimlet Bits "Bee".....dis 25 %
Double Cut Gimlet Bits, Shepardson's.....dis 40 %
Double Cut Gimlet Bits, Ct. Valley Mfg. Co. dis 30&10 %
Double Cut Gimlet Bits, Hartwell's.....dis 60 %
Double Cut Gimlet Bits, Douglass'.....dis 40 %
Double Cut Gimlet Bits, Ives'.....dis 50 %
Morse's Bit Stock Drill.....dis 25&10 %
Holtz Bit Stock Drills.....dis 25&10 %
L'Hommedieu's Ship Augers.....dis 15 %

Awl Hafts.
Sewing, Brass Ferrule.....$3.50 ℘ gross—dis 40&10 %
Patent Sewing, Short.....$1 00 ℘ doz.—dis 40&10 %
Patent Sewing, Long.....$1.20 ℘ doz.—net
Patent Peg, Plain Top.....$10.00 ℘ gross—dis 40&10 %
Patent Peg, Leather Top.....$12.00 ℘ gross—dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common.....℘ gross $1.70—dis 25&10 %
Awls, Shouldered Peg.....℘ gross $2.45—dis 25&10 %
Awls, Patent Peg.....℘ gross 63c—dis 25&10 %
Awls, Shouldered Brad.....℘ gross $2.70—dis 25&10 %
Awls, Handled Brad.....$7.50 ℘ gross—dis 25&10 %
Awls, Handled Scratch.....$7.50 ℘ gross—dis 25&10 %
Awls, Socket Scratch.....$1.50 ℘ gross—dis 10&10 %
Brad Sets, Aiken's.....℘ doz $12.00—dis 45&10 %
Millers Falls Adj. Tool Hdles.....℘ doz $12—dis 25 %
Brad Sets, No. 42, $10.00; No. 43, $12.50.....dis 70&10&5 %
Brad Sets, Stanley's Excelsior, No. 1, $9.60...dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 2, $4.80...dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 3, $7.80...dis 30&10 %

Axes.
Single Bit, 4½ to 5½ and under.....℘ doz $8.00 net
Single Bit, 4½ to 6 and over.....℘ doz $8 50 net
Single Bit, beveled.....50c ℘ doz advance
Double Bit, 4½ to 5½ and under.....℘ doz $15.00 net
Double Bit, 4½ to 6 and over.....℘ doz $16.00 net
Double Bit, beveled.....$1.00 ℘ doz advance

Axle Grease.
Frazer's.....℘ ℔ 6c

Axles.
Standard list.....dis 45 %

Balances.
Spring Balances.....dis 33⅓ %

Bells.
Hand, Light Brass.....dis 60&10 @ 70 %
Hand, Extra Heavy.....dis 45 %
Hand, White Metal.....dis 60 %
Hand, Silver Chime.....dis 20&10 %
Hand, Globe (Cone's Patent).....dis 25&10 %
Gong, Abbe's.....dis 25&10 %
Gong, Yankee.....dis 30&10 %
Gong, Barton's.....dis 30&10 %
Crank, Taylor's.....dis 25&10 %
Crank, Brooks'.....dis 50&10&2 %
Crank, Cone's.....dis 10 %
Crank, Connel's.....dis 15&10 %
Lever, Sargent's.....dis 55&10 %
Lever, Taylor's Bronzed or Plated.....net
Lever, Taylor's Japanned.....dis 25 %
Lever, R. & E. M. Co.'s.....dis 50&10&2 %
Lever, Reading.....dis 25&10&10 %
Pull, Brook's.....dis 50&10&2 %
Pull, Western.....dis 25&10 %
Call.....dis 25 %
Cow, Common Wrought.....dis 55&10 %
Cow, Western.....dis 20&10 %
Cow, Western, Sargent's list.....dis 55&10 %
Cow, Kentucky "Star".....dis 20&10 %
Cow, Kentucky Sargent's list.....dis 55&10 %
Cow, Dodge's Genuine Kentucky, new list—
Nos. 0 1 1½ 2 3 4 5 6 Hog
$12.00 10.00 9.00 8.00 7.00 5.00 3.50 2.50 5.00 } dis 60 %
Cow, Texas "Star".....dis 40&10 %

Bellows.
Blacksmiths' Common.....dis 45 %
Blacksmiths' Extra Pittsburgh Pattern.....dis 20 %
Molders'.....dis 25 %
Hand Bellows.....dis 20 %

Belting, Rubber.
Belting and Packing Co.....dis 50 %

Bit Holders.
Extension, Barber's.....℘ doz $15.00—dis 40&5 %
Extension, Ives'.....℘ doz $15.00—dis 40 %
Diagonal.....℘ doz $24.00—dis 40 %
Angular.....℘ doz $24.00—dis 40&5 %

Blind Adjusters.—Domestic..℘ doz $3.00—dis 30 %
Excelsior.....℘ doz $16.00—dis 50&10&2 %

Blind Fasteners.
Mackrell's.....℘ doz pairs, $1.00 dis 20&10 %
Van Sand's Screw Pattern.....$9 ℘ gro. dis 10&2 %
Van Sand's Old Pattern.....$9 ℘ gro. dis 10&2 %
Washburn's Old Pattern.....$9 ℘ gro. net
Merriman's.....new list, net
Salisbury & Austin, No. 2008.....$9 per gro. net
Security Gravity.....$9 per gross, net

Blind Staples.
Bar bed, ⅜ in. and larger.....℘ ℔ 11c net
Bar bed ⅝ in.....℘ ℔ 13c net

Blocks.
Penfield Block Co., I. R. and I. Strap'd.....dis 35 %
Penfield Block Co., W. I. C. bushed.....dis 35 %
Penfield Block Co., W. I. all steel roll'r.....dis 20 %
Penfield Block Co., L. & I Sheaves.....dis 35 %
} New List
Stanley Rule & Level Co.'s.....dis 40&10 %

Bolts.
Cast Iron Barrel Shutter, &c.....dis 55&10 %
Cast Iron Chain (Sargent's list).....dis 65&10 %
Ives' Patent Door Bolts.....dis 55&10 %
Wrought Barrel.....dis 55&10 %
Wrought Square.....dis 55&10 %
Wrought Shutter, all Iron, Stanley's list.....dis 50&10 %
Wrought Shutter, Brass Knob, Stanley's list.dis 50&10 %
Wrought Shutter, Sargent's list.....dis 55&10 %
Wrought Sunk Flush, Sargent's.....dis 75&10 %
Wrought Sunk Flush, Stanley's.....dis 50&10 %
Wrought B. K. Flush. Com'n Stanley's.....dis 55&2½ %
Carriage and Tire, Common.....dis 80@80&10 %
Carriage and Tire, Philadelphia, new list.....dis 70 %
Carriage and Tire, Philadelphia Pattern.....dis 70 %
Union Carriage.....dis 70 %
R. B. & W. Carriage (old list).....dis 65 %
Tire, Am. Screw Co.'s, Phila.....dis 75 %
Tire, "Bay State".....dis 65&5 %
Tire, R. B. & W., new list.....dis 75&10 %
Stove—American Screw Co.'s.....dis 40 %
Stove, R. B. & W.....dis 40 %
Stove, R. & E. Mfg. Co.....dis 40 %
Plow.....dis 50 %
Plow, R. B. & Co.....dis 40 %
Machine.....dis 60&10 %
Bolt Ends.....dis 60&10 %

Borax......10c ℘ ℔ net

Boring Machines. Upright Angular
First quality, no Augers.....$5.50 $6.75..dis 45@50 %
Phillips, with Augers.....7.00 7.50.....net
Jennings & Co., no Augers.....5.50 6.75.....dis 40 %

Boxes.
Interchangeable Shelf Boxes.....dis 20 %

Braces.
Q. S. Backus.....dis 50@60 %
Wilson Mfg. Co.....dis 10 %
Barber's.....dis 40&5 %
Spofford's Patent.....dis 50&5 %
Ives' Patent Braces.....dis 55&5&5 %
Common Ball (American).....dis 55 %
Amidon's.....dis 50 %
Barker's Imp'd.....dis 40 %
Empire.....dis 50 %
Buffalo Ball.....dis 40 %

Brackets.
Shelf, plain.....dis 50&10 %
Shelf, fancy.....dis 60&10 %
Reading, Plain.....dis 60&10 %
Reading, Rosette.....dis 60&10 %

Bright Wire Goods list of Dec. 15, '79..dis 55&10 %

Bull Rings.
Union Nut Co.....dis 55 %
Sargent's.....dis 66⅔&10 %
Hotchkiss' low list.....dis 15 %
Humason, Beckley & Co's.....dis 66⅔&10 %
Peck, Stow & W. Co's.....dis 33⅓ & 10 %

Butts.
Wrought Brass.....dis 65&10&5 %
Cast Brass, Tiebout's.....dis 33⅓ %
Cast Brass, Corbin's Fast Joint.....dis 20&10 %
Cast Brass, Loose Joint.....dis 10&10 %
Fast Joint, Narrow.....dis 45&10 %
Fast Joint, Broad.....dis 45&10 %
Loose Joint.....dis 55&10 %
Loose Joint, Japanned.....dis 55&10 %
Loose Joint, Japanned with Acorns.....dis 55&10 %
Parliament Butts.....dis 55&10 %
Mayer's Hinges.....dis 60&10 %
Loose Pin, no Acorn.....dis 50&10 %
Loose Pin, Acorns.....dis 50&10 %
Loose Pin, Acorns, Japanned.....dis 60&10 %
Loose Pin, Acorns, Japanned, Plated Tips..dis 60&10 %
WROUGHT IRON.
Fast Joint, Narrow.....dis 40&10 %
Fast Joint, Lt. Narrow.....dis 50&10 %
Fast Joint, Broad.....dis 50&10 %
Loose Joint, Broad.....dis 55&10 %
Table Butts, Back Flaps, &c.....dis 50&10 %
Inside Blind Regular.....dis 50&10 %
Inside Blind, Light.....dis 50&10 %
Loose Pin, Wrt.....dis 55&10 %
Loose Pin, Light.....dis 50&10 %
Spring Hinges:
Geer's Spring and Blank Butts.....dis 33⅓ %
Sabin Mfg. Co.'s Double Acting.....dis 35 %
Union Spiral Spring, Japanned.....dis 25 %
Union Spring Hinge Co.'s.....dis 25 %
American Spring Hinge Co.'s.....dis 30 %
Gem Spring Hinges.....dis 30 %
Barker's Double Acting.....dis 20 %
Union Mfg. Co.....dis 25 %
Bommer's.....dis 25 %
Buckman's.....dis 25 %
Empire.....dis 50&10 %
Acme.....dis 65&10 %
Climax.....dis 50&10 %
Blind Butts Parker.....dis 70&2 %
Blind Butts, Palmer.....dis 45&10 %
Blind Butts, Seymour.....dis 70 %
Blind Butts, Shepard's "Double Locking," Nos. 1 & 2.....dis 70 %
Shepard's Standard, Nos. 4 and 5.....dis 70 %
Blind Butts, Lull & Porter.....dis 70&10 %
Blind Butts, Nicholson.....dis 45&10 %
Blind Butts, Huffer.....dis 60 %
Blind Butts, Clark's, Nos. 1, 3, 5.....dis 70&2 %
Blind Butts, Sargent's, Nos. 1, 3.....dis 50&10&10 %
Blind Butts, Sargent's, No. 12.....dis 70&10 %
Blind Butts, Reading's Gravity.....dis 66⅔&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3.....dis 60&10 %

Bow Pins.
Humason, Beckley & Co.'s, Nos. 1 and 2.....dis 60 %
Humason, Beckley & Co.'s other Nos.....dis 66⅔&10 %
Sargent & Co.'s.....$19.70 and $21.40, dis 66⅔&10 %
Hotchkiss.....dis 25 %
Peck, Stow & W. Co.....dis 50&10 %

Butcher's Cleavers.
Humason & Beckley Mfg. Co.....dis 25 %
Bradley's.....dis 25 %
Beatty's.....dis 25&5 %
1 2 3 4 5 6 7 8
$16.50 19.00 21.50 24.00 27.00 30.00 33.50 36.50

Can Openers.
Messenger's Comet.....℘ doz $3.00, dis 25 %
American.....℘ gross $6.00, dis 25 %
Duplex.....℘ doz 25c, dis 15@20 %
Lyman's.....℘ doz $3.75, dis 20 %
No. 4, French.....℘ doz $2.25, dis 55 %
No. 5, Iron Handle.....℘ gross $9 00, dis 25 %
Eureka.....℘ doz $2.50, dis 10 %
Sardine Scissors.....℘ doz $7.00, dis 55 %
Star.....℘ doz $5.00, dis 25&5 %
Sprague, No. 1, $2.00; No. 2, $2.25; No. 3, $2.50.....dis 50&10 %
"Worlds Best" ℘ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $30.00.....dis 50 & 10 %
Universal.....℘ doz $3.00, dis 35 %
Domestic.....℘ doz $2.50, dis 45 %
Champion.....℘ doz $2.00, dis 50 %

Caps—Percussion, ℘ 1000.
Hicks & Goldmark's
F. L. Waterproof, 1-10's.....50c
E. B. Trimmed Edge, 1-10's.....65c
E. B. Ground Tr'md Edge, Central Fire, 1-10's..70c
Pistol Waterproof, extra heavy, 1-10's.....$1.40
Musket Caps, 1-10's.....80c
} dis 10&5 %
U. M. C., F. C. trimmed.....50c
U. M. C., F. L. ground.....70c } dis 10&10 %
U. M. C., Cen. fire ground.....70c
U. M. C., Double W. Proof.....$1.40 } dis 10&5 %
G. D. & S. B.....33c, dis 10 %
Double Waterproof, in 1 10's.....$1.40
Colt's Pistol, in 1-10's.....75c } dis 10 %
F. L.....50c
E. B. 1-10, trimmed.....65c } dis 10&5 %
E. B. 1-10, ground edge.....70c
Musket, in 1-10's.....80c, dis 25 %
Cartridges.—Rim.....dis 75&5 %
Central Fire.....dis 45 %
Cards.—Horse and Curry.new list, July, '81, dis 10 %
Cotton.....new list, July, '81, dis 10 %
Wool.....new list, July, '81, dis 10 %

Carpet Stretchers.
Cast Steel, Polished.....℘ doz $5.00, dis 30 %
Cast Iron, Steel Points.....℘ doz $2.00, dis 50&5 %
Socket.....℘ doz $2.00, dis 25 %
Bullard's.....dis 25 %

Casters.—Bed.....dis 45@50 %
Plate.....45@50 %
Shallow Socket.....dis 35&10 %
Deep Socket.....dis 25&10 %
Martin's Patent (Phoenix).....dis 25 %

Cattle Leaders.
Humason, Beckley & Co.'s.....dis 70&10 %
Sargent's.....dis 70&10 %
Hotchkiss.....dis 25 %
Peck, Stow & W. Co.....dis 33⅓&10 %

Chain.
Trace, 6½-10-2.....℘ pair 79c
Trace, 6½-10-3.....℘ pair 70c } dis 35 %
Trace, 7-10-2.....℘ pair 80c
German Halter Chain, list of Dec. 31, 1881.....dis 50 %
German Coil, list of Dec. 31, 1881.....dis 50 %
Covert Halter, Hitching and Breast.....dis 45&5 %
Oneida Halter Chain (old list).....dis 45 %
Galvanized Pump Chain.....℘ ℔ 6¼c net
Jack Chain, Iron.....dis 60&10 %
Jack Chain, Brass.....dis 50&10 %

Chalk.
White.....℘ gross 60c net
Red.....℘ gross 80c net
Blue.....℘ gross $1.00 net
White Crayons.....℘ gross 110 net

Chalk Lines.—See Lines

Chisels.
Socket Framing, Crossman.....dis 65&5 %
Socket Framing, Arlington Edge Tool Co...dis 65&10 %
Socket Framing, Buck Bros.....1876 list, dis 22½ %
Socket Framing, Merrill.....dis 65&10 %
Socket Framing, Witherby Tool Co.....dis 65&10 %
Socket Framing, Douglass'.....dis 65&10 %
Socket Firmers, Crossman.....dis 65&5 %
Socket Firmers, Arlington Edge Tool Co.....dis 65&10 %
Socket Firmers, Buck Bros.....1876 list, dis 22½ %
Socket Firmers, Merrill.....dis 65&10 %
Socket Firmers, Witherby Tool Co.....dis 65&10 %
Socket Firmers, Douglass'.....dis 65&10 %
Socket Corner.....dis 65&10 %
Tanged Firmers.....dis 40@45 %
Tanged Firmers, Butcher's.....$5.00@$5.25 to £
Tanged Firmers, Spear & Jackson's.....5.00 to £
Tanged Firmers, Buck Bros (Shank).....5.25 to £
Globe Mfg. Co.....dis 65&10 %

Clamps.
Iron, Providence Tool Co.'s Wrt. Iron.....dis 25 %
Iron, Adjustable, Gray's.....dis 20 %
Iron, Adjustable, Lambert's.....dis 20 %
Iron, Adjustable, Snow's.....dis 40&5 %
Iron, Adjustable, Hammer's.....dis 15 %
Iron, Adjustable, Stearns'.....dis 20&10 %
Iron, Cabinet, Sargent's.....dis 70&10 %
Iron, Carriage Makers', Sargent's.....dis 65&10 %

Clips, Axle.
Norway or Best.....dis 60&5 %
Superior.....dis 60&5 %

Cockeyes......dis 55 %

Cocks, Brass.
Racking, new list, July 10, 1880
Globe, new list, July 10, 1880
Plain Bibbs, new list, July 10, 1880
Ale and Beer, new list, July 10, 1880 } dis.....45 %

Coffee Mills.
Board and Box.....dis 45 %
Wilson's.....dis 45 %
Selsor's Pat.....$9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.).....dis 20&10 %
The "Swift" (Lane Bros.).....dis 20&10 %
Webb's Patent.....dis 45 %

Combined Dinner Pail and Lantern.
Per doz $15.00.....dis 30 %

Compasses, Dividers, &c.
Compasses.....dis 55 %
Callipers.....dis 55 %
Dividers.....dis 55 %
Bemis & Call Co.'s Dividers.....dis 60&5 %
Bemis & Call Co.'s Compasses and Callipers..dis 60&5 %
Bemis & Call Co.'s Wing & inside or outside..dis 60&5 %
Bemis & Call Co.'s Double.....dis 60 %
Bemis & Call Co.'s (Call's Patent Inside).....dis 30 %
Excelsior.....dis 60 %
Cook's Extension.....dis 25 %

Coopers' Tools.
Bradley's.....dis 10 @ 20 %
Barton's.....dis 20 %

Corkscrews.—Humason & Beckly Mfg. Co.dis 33⅓ %
Clough's Pat.....dis 33⅓ %

Corn Knives and Cutters.—Bradley's.....dis 10 %
Wadsworths.....dis 25 %

Crow Bars.
Cast Steel.....℘ ℔ 6¼c
Iron, Steel Points.....℘ ℔ 5 c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80, 2.00, 2.40.....dis 10 %
Curling Tongs.....℘ doz $2.65, dis 10 %
Pinching Irons.....℘ doz $7.50, dis 20 %

Curry Combs.
Fitch's.....dis 50&10 %
Hotchkiss, Novelty, new list, July 1880.....dis 25 %
Hotchkiss, Exclr. Supr. Champion.....dis 25 %
Rubber.....℘ doz $10.00, dis 25 %

Curtain Pins.
Silvered Glass.....net
White Enamel.....net

Cutlery.
Meriden Cutlery Co. (Table).....net
Am. Miller Bro.'s Cutlery Co.....dis 25 %
Humason & Beckley, Pocket.....dis 33⅓ %
Naugatuck Cutlery Co.....list net
Aaron Burkinshaw's Pocket.....dis 25 %

Dog Collars.
Embossed Gilt.....dis 30&10 %
Leather.....dis 40 %
Brass.....dis 40 %

Door Springs.
Torrey's Rod, regular size, ℘ doz., $3.....dis 50 %
Gray's Rod.....dis 15 %
Bee Rod.....dis 15 %
Warner's.....dis 30 %
Gem (Coil):
No. 1, Large Japanned.....℘ doz $4.00
No. 2, Medium, Japanned.....℘ doz 2.75 } dis 50 & 10 %
No. 3, Small, Japanned.....℘ doz 2.00
Star (Coil)—For Cop'd, Nickel-Plated &c., see list.
No. 4 ("Shoo Fly") Screen door size, ℘ doz $1.50
No. 5, Screen Door size.....℘ doz 2.00
No. 6, Medium.....℘ doz 2.75 } dis 60 %
No. 7, Large.....℘ doz 4.00
Sabin's Lever..No. 1, $1; 2, $1.50; 3, $2; 4, $2.50..dis 35 %
Sabin's Boss. No. 1, ℘ doz. $4.00; 2 $2.75; 3, $2.dis 33⅓ %
Sabin's Crown.....℘ doz $1.50, dis 33⅓ %
Philadelphia.....5 in., $5.00; 8 in., $7.75, dis 35 %
Cowell's.....No. 1, ℘ doz. $18.00; No. 2, $15.00, dis 50 %
Rubber, complete.....℘ doz. $1.80, dis 10 %
Hercules.....dis 50 %

Drawing Knives.
Arlington Edge Tool Co.....dis 65&10 %
Crossman's No. 1.....dis 65&5 %
Morrill.....dis 65&10 %
Nobles Mfg. Co.....dis 15 %
Bradley's.....dis 35 %
Adjustable Handle.....dis 20 %
Witherby Tool Co.....dis 65&10 %
Douglass.....dis 65&10 %
Globe Mfg. Co.....dis 65&10 %

Drills and Drill Stocks.
Blacksmiths'.....each, $2.50, dis 10 %
Blacksmiths' Self-Feeding.....each, $7.50, dis 20 %
Breast, P. S. & W.....dis 20&10 %
Breast, Hotchkiss'.....dis 20 %
Breast, Wilson's.....dis 20 %
Breast, Millers Falls.....each, $3.00, dis 25 %
Breast, Bartholomew's.....each, $2.50, dis 25&10 %
Ratchet, Merrill's.....dis 10 %
Ratchet, Ingersoll's.....dis 25 %
Ratchet, Whitney's.....dis 20 %
Ratchet, Weston's.....dis 20 %
Ratchet, Moore's Triple Action.....dis 20&25 %
Whitney's Hand Drill, Plain, $11.00 Adjustable, $12.00.....dis %
Wilson's Drill Stocks.....dis 10 %
Automatic Boring Tools.....each, $2.25, dis 20 %

Drill Chucks.
Morse's Beach Patent.....dis 30 %
Morse's Adjustable.....each, $10.00, dis 30 %
Danbury.....each, $8.00, dis 30 %

Egg Beaters.
Dover.....℘ doz. $2.50, dis 2 %
Monroe's.....dis 50 %
National.....℘ doz. $4.50, dis 33⅓ %
Standard.....℘ gross, $18.00, dis 25 %
Family (T. & S. Mfg. Co.).....℘ gross, $18.00, net
Acme.....℘ gross, $12.00, dis 25 %
Triumph (T. & S. Mfg. Co.).....℘ gross, $11.50, net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved), ℘ 100, $15 00 @ $54.00.....dis 10 %
Mill E. Buckets, heavy, 5 to 10 in. (Duc's Improved), ℘ doz. $5.60 @ $10.20.....dis 10 %
Storehouse (Duc's Patent), 12 to 17, $12 @ $20.....dis 10 %

Emery and Emery Paper.
Regular numbers.....℘ ℔ 6c
Flour and F. F.....℘ ℔ 4c
B. & A. Emery Paper.....dis 30&5 %
Sibley's Emery and Crocus Cloth, large size, $10; medium, $7.50 ℘ ream.....dis 15 %

Enameled and Tinned Ware.
Kettles.....dis 50 %
Sauce Pans.....dis 25 %
Tinned Sauce Pans.....dis 25 %

Escutcheon Pins.
Brass.....dis 50 %

Escutcheons.
Door Lock.....Same discounts as Door Locks
Brass Thread.....dis 55 %
Wood.....dis 25 %

Faucets.
Fenn's.....dis 40 %
Bohren's Patent Rubber Ball.....dis 25 %
Fenn's Cork Stops.....dis 33⅓ %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 20&10 %
West's Patent Key.....dis 45 %
Anchor Lock.....dis 45 %
Metallic Key, Leather Lined.....dis 60 %
Cork Lined.....dis 70 %
J. Sommer's Best Metallic Key.....dis 40&10 %
J. Sommer's Cork Lined, 1st quality.....dis 50 %
Self-Measuring, Enterprise.....℘ doz. $36.00, dis 20&10 %
Self-Measuring, Lane's.....℘ doz. 36.00, dis 20&10 %
Self-Measuring, Victor.....℘ doz. $36.00, dis 25&10 %

Felloe Plates.....℘ ℔, 10c, dis 25 %

Files.
J. & Riley Carr.....new list April 1, '83, dis 20 %
J & Riley Carr Horse Rasps.....dis 10 %
Butcher's.....new list, dis 15 %
Moss & Gamble.....dis 50 %
H. Disston & Sons (new list).....dis 50 %
Heller Bros.' Horse Rasps.....dis 35 %
Heller Bros.' Files.....dis 50 %
Nicholson.....dis 50 %
New American.....dis 50 %
Union File Co.....dis 50 %
Stubs.....new list, dis 25@30 %

Fluting Machines.
Knox, 4½-inch Rolls.....$3.50 each } dis 25 %
Knox, 6-inch Rolls.....$4.00 each
Eagle, 3½-inch Roll.....$2.15, dis 25 %
Eagle, 4½-inch Roll.....2.85, dis 25 %
Crown, 4½-in., $3.50; 6-in., $4.00; 8-in., $6.40 each, dis 25 %
Crown Jewel.....6-in., $3.40 each, dis 25 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 25 %
Domestic Fluter.....$1.50 each, net
Geneva Hand Fluter, White Metal...℘ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00 ℘ doz.....dis 30 %
Shepard Hand Fluter, No. 85.....per doz $15, dis 40 %
Shepard Hand Fluter, No. 110.....per doz $8.75, dis 30 %
Shepard Hand Fluter, No. 05.....per doz $6.50, dis 20 %
Clark's Hand Fluter.....℘ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron.....℘ doz $15.00, dis 30 %
Buffalo.....℘ doz $10.00, dis 10 %

Fluting Scissors.....dis 45 %

Fly Traps.
Paragon.....℘ doz., $3, net

Forks.
Hay, Manure and Spading.....dis 50&10 %
Plated, A 1, Rogers & Bro.....dis 40&10&5 %
Plated, Reed & Barton.....dis 40&10&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co.....dis 25 %

Fry Pans.
Burnished list as follows.....dis 60&10&5 %
No..... 0 1 2 3 4 5 6 7 8
℘ doz.....$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
"Acme".....dis 40&10 %

Gauges.
Marking Stanley's.....dis 50&10 %
Marking, Chapin's.....dis 55&10 %
Wire.....dis 70&10 %
Wire, Disston's.....dis 20 %
Wire, Wheeler, Madden & Co.....dis 10 %

Gimlets.
Nail and Spike.....dis 40&10 %
"Eureka" Gimlets.....dis 40&10 %
"Diamond" Gimlets.....dis 40&10 %
Double Cut, Shepardson's.....dis 40&10 %
Double Cut, Hartwell's.....dis 20&10 %
Double Cut, Ives'.....dis 20&10 %
Double Cut, Douglass'.....dis 40 %
"Bee".....℘ gro. $12.00, dis 25 %

Glue Pots.
Tinned and Enameled.....dis 25&5 %
Family, Howe's "Eureka".....dis 25 %
Family, L. F. & C.'s "Handy".....dis 30 %

Grindstone Fixtures.
Sargents Patent.....dis 70&10 %
Reading Hardware Co.....dis 30&10 %

Gun Wads.
U. M. C. B. E., 11 up.....$2.00
U. M. C. B. E., 9&10.....2.50
U. M. C. B. E., 7&8.....2.80
U. M. C. P. E., 11 up.....3.10
U. M. C. P. E., 9&10.....4.00
U. M. C. P. E., 7&8.....4.90
} dis 5&5 %

Halters.
Covert's Pat. Rope.....dis 50 %
Horse and Cattle Ties Covert's.....dis 50 %

Hammers.
Maydole's.....dis 15 %
Cheney's, new list, March, 1883.....dis 20&10 %
Hartford Hammer Co. (new list July 1, '81).....dis 20 %
Humason & Beckley.....dis 15 %
Verree.....dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.26, 1.50 and 1.75.dis 25&10 %
Nelson Tool Works.....dis 40&10 %
Warner & Noble's.....dis 5 %
Yerkes & Plumb.....dis 15 %
Wilkinson's Smiths'.....11¼c ℘ ℔ net

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ℘ doz. dis 10 %
Providence Tool Co., Leg Irons, $25.00 ℘ doz.....dis 10 %
Tower's.....dis 25 %

Handles.—Door or Thumb Latches.
Nos..... 0 1 2 3 4
Per doz... $0.80 1.00 1.18 1.35 1.60.....dis 60&10 %
Roggin's Latches.....℘ doz 35c. @ 40c. net
Bronze Iron Drop Latches.....℘ doz $0.90 @ 1.10
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88.....dis 10 %
Barn Door.....℘ doz $1.60, dis 10&10 %
Wrought Chest.....dis 70 %
Surface Chest.....dis 60&10 %
Flush Chest.....dis 60&10 %
Lifting.....dis 55&10 %
Saw and Plane.....dis 40&10 %
Boynton's Loop Saw Handles.....30c, dis 35 %
Boynton's Centennial Saw Handles.....30c, dis 25 %
Hammer and Hatchet.....dis 20 %
Brad Awl.....℘ gross, $1.00 dis 10 & 20 %

Hickory Firmer Chisel, assorted, ℘ gross. $4.50
Hickory Firmer Chisel, large, ℘ gross..... 5.00
Apple Firmer Chisel, assorted, ℘ gross..... 5.00
Apple Firmer Chisel, large, ℘ gross..... 6.00
Socket Firmer Chisel, assorted, ℘ gross..... 3.00
Socket Framing Chisel, assorted, ℘ gross..... 5.00
File assorted, ℘ gross..... 2.75
Auger, assorted, ℘ gross..... 5.00
Auger, large, ℘ gross..... 7.00
} dis 20&10 @ 25&10
Patent Auger, Ives'.....dis 25 %
Patent Auger, Douglass'.....℘ set $1.25 net
Patent Auger, Swan's.....℘ set $1.00 net

Hangers.
Barn Door, old patterns.....dis 60&10 %
Barn Door, New England.....dis 65&10 %
Climax (Anti-Friction).....dis 50 %
Challenge.....dis 50 %
"Champion" Medina Mfg. Co.....$15; dis 50&10 %
Sterling Improved (Anti Friction).....dis 60&10 %
Cheritree.....dis 50 %
Kidder's.....dis 50&5 %
U. S.....4 in., $12; 5 in., $15; dis 60 %
The "Boss".....dis 50&10 %
Terry's Patent.....5 in., $12; 3½ in., $10; dis 40 %

Harness Snaps.
Anchor (T. & S. Mfg. Co.).....dis 60 %
Henshaw's, list of 1½ changed to $14.00.....dis 60 %
Judd's, list of 1½ changed to $14.00.....dis 55&10 %
Fitch's (Bristol), list of 1½ change to $14.00...dis 55&10 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 50 %
Sargent's.....dis 70&10 %
German, low list, Sep., 1882.....dis 33⅓ %
German, Sargent's new list.....dis 60&10 %
Covert.....dis 50 %
Covered Spring, new list, Oct., 1882.....dis 60& %

Hatchets.
Isaiah Blood.....dis 30 %
Shingling, Nos. 1 2 3.....℘ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3.....℘ doz 7.75 8.40 9.25
Lathing, Nos. 1 2 3.....℘ doz 7.50 8.00 8.50
Hunt's.....dis 25 %
Shingling, Nos. 1 2 3.....℘ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3.....℘ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3.....℘ doz 7.30 8.25 9.00
Hurd's.....dis 30 %
Shingling, Nos. 1 2 3.....℘ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3.....℘ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3.....℘ doz 8.00 8.50 9.00
Yerkes & Plumb.....dis 30 %
Shingling, Nos. 1 2 3.....℘ doz $7.50 $8.00 $8.50
Claw, Nos. 1 2 3.....℘ doz 8.25 8.75 9.25
Lathing, Nos. 1 2 3.....℘ doz 7.50 8.00 8.50
Simmons'.....dis 30 %
Shingling, Nos. 0 1 2 3..℘ doz $7 50 $8.00 $8.50 $9.00
Claw, Nos. 0 1 2 3..℘ doz 8.50 9.00 9.50
Lathing, Nos. 0 1 2 3..℘ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4..℘ doz 9.00 10.00 12.00 14.00
Broad, Nos. 5 6 7 8..℘ doz 16.00 18.00 20.00 22.00
Collins.....dis 10
Shingling, Nos. 1 2 3.....℘ doz $5.50 $6.00 $6.50
Claw, Nos. 1 2 3.....℘ doz 6.00 6.50 7.00
Lathing, Nos. 1 2 3.....℘ doz 5.50 6.00 6.50
Peck's Champion Blade.....dis 30
Shingling, Nos. 1 2 3.....℘ doz $8.00 $8.50 $9.00
Lath, Nos. 1 2 3.....℘ doz 8.00 8.50 9.00
Claw, Nos. 1 2 3.....℘ doz 9.00 9.50 10.00
Half, Nos. 1 2 3.....℘ doz 8.00 8.50 9.00
Ax Pattern, Nos. 1 2 3.....℘ doz 10.00 11.00 12.00

Hay Knives.
"Lightning".....℘ doz $20.00 dis 10 %
Wadsworth's.....dis 33⅓ %

Hinges.
Gate, Western.....℘ doz $4.00 dis 55 %
Gate, N. E.....℘ doz $7.70, dis 55 %
Gate, N. E. Reversible.....℘ doz $6.45, dis 55 %
Gate, Clark's, Nos. 1 2 3.....dis 50 %
Gate, N. Y. State.....℘ doz $5 00, dis 45&10 %
Gate, Automatic.....℘ doz $12.50, dis 50 %
Gate, Common Sense.....℘ doz pair $4 50, dis 50 %
Gate, Seymour's.....dis 45&10 %
Gate, Shepard's.....Nos. 1, 2, 5, 10, 20 & 25, dis 50&10 %
Rolled Blind Hinges.....dis 60&10 %
Rolled Plate.....dis 60&10 %
Rolled Raised.....dis 60&10 %
Plate Hinges "Providence" { 8, 10 & 12 in., $5.55 ℘ 100 ℔; over 12 in., $4.50 ℘ 100 ℔ } ..dis 10 %
Screw Hook and Strap { 8, 10, 12 in., $7.00 ℘ 100 ℔; 14 to 36 in. $5.75 ℘ 100 ℔ } ..dis 10 %
Heavy Welded Hook { 8 to 12 in., $7.00 ℘ 100 ℔; 14 in & up, $5.50 ℘ 100 ℔ } dis 10 %
Screw Hook and Eye { ⅜ & 1 in. 9c; ⅝ in. 9c; ⅜ in. 10c; ⅞ in. 12c } dis 20 %
Wrought Strap and T.....dis 55&10 %

Hoes.
Riveted Shank.....℘ doz $5.00, dis 55 %
Socket.....℘ doz $5.25, dis 55 %
Grub.....℘ doz $11 dis 35 %
Planters'.....dis 50 %
Scovill Pattern.....dis 50 %
Handled Planters'.....dis 50&10 %
Hick's Pat. Solid C. S. Planters'.....dis 20&10&10 %
Hick's Pat. Solid C. S., Scovill Pattern.....dis 20&5&35 %
Winsted & Lane, Planters'.....dis 25 %
Winsted & Lane, Scovill Pattern.....dis 20&25 %
Magic.....℘ doz $5 net

Hooks.
Bird Cage, Sargent's list.....dis 60&10 %
Bird Cage, Reading.....dis 40&10 %
Cotton.....℘ doz $4.00, dis 50 %
Cotton Patented (N. Y. Mallet & Handle W'ks), dis 30 %
Cotton (Humason & Beckley Mfg. Co).....dis 40 %
Belt.....dis 60&10
Bench—Hotchkiss' $5.00 ℘ doz.....dis 10 %
Weston's, No. 1, $10.00; No. 2, $9.00 ℘ doz.....dis 25 %
McGill's, $3.00 ℘ doz.....dis 10 %
Clothes Line, Sargent's list.....dis 65&10 %
Clothes line, Reading list.....dis 45&5&10 %
Ceiling, Sargent's list.....dis 60&10&10 %
Harness, Reading list.....dis 40&10&10 %
Coat and Hat, Sargent's list.....dis 60&10&10 %
Coat and Hat, Reading.....dis 40&10&10 %
Wire Coat and Hat, Gem.....dis 30&10 %
Wire Coat and Hat, Miles'.....dis 70 %
Picture Hooks, Brown's Pat. Solid Brass, $4.00 ℘ gross.....dis 25 %
Tassel and Picture (T. & S. Mfg. Co.).....dis 50 %
Wrought Staples and Hooks & Staples..dis 70&7½&10 %
Wrought Staples, Stanley's list.....dis 70&7½&10 %
Wire Screw Hooks and Eyes.....dis 55&10 %
Grass and Bush.....dis 45@50 %
Whiffletree—Patent.....dis 40 %
Hooks and Eyes—Malleable Iron.....dis 60&10 %
Hooks and Eyes—Brass.....dis 60&10 %

Horse Nails.
Nos. 5 6 7 8 9 10
Ausable, ℘ ℔....31c 28c 27c 25c 24c 23c.. dis 30&10 %
Clinton, Plain, ℘ ℔ 23c 21c 20c 19c 18c.....dis 30&10 %
Clinton, Fin., ℘ ℔ 24c 22c 21c 20c 19c.....dis 30&10 %
Essex, ℘ ℔...31c 28c 26c 25c 24c 23c.....dis 30&10 %
Putnam "...27c 24c 22c 21c 20c 19c.....dis 5&7 %
Vulcan, "...26c 23c 21c 20c 19c 18c.....dis 12½ %
Globe, "...24c 21c 19c 18c 17c 16c.....dis 12½ %
A. C., "...26c 23c 21c 20c 19c 18c.....dis 10&10 %
Ch'mpl'n Forged "...31c 28c 26c 24c 24c 23c..... dis 30 %
New Haven, " 31c 28c 26c 25c 24c 23c.....dis 30&10 %
Bridgewater, " 24c 21c 19c 18c 17c 16c.....dis 25 %

Horse Shoes.
Burden.....℘ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy.....℘ keg $4.37½
Walker's Forged, Light, Med. or Heavy.℘ keg $4.37½
Mule shoes.....℘ keg $5.37½
Dunning's Steel.....℘ keg $9.25

Ice Awls, Chisels, &c.
American Ice Chisel.....℘ doz $3.00 net
National Ice Chisel.....℘ doz $6.25 dis 20 %
Novelty Ice Breakers.....℘ doz. $6.25 dis 20 %
White's Sliding Head Picks.....℘ doz $2 50 dis 40 %
Dunlap's Ring Picks.....℘ doz $2.00 dis 20 %
Wood Head Picks, Sargent's.....℘ doz $1.60 dis 50&10 %
Iron Head Picks, Sargent's.....℘ doz $1.25 dis 50&10 %
Ice Mallets, Pick in head.....℘ doz $1.75 dis 15 %
Ice Mallets, Pick in Handle.....℘ doz $2.00 dis 15 %
Ice Axes, Small Cast or Malleable..℘ doz $1.20 dis 10 %
Combination Ice Tools.....℘ doz $2.00 net

Ice Cream Freezers.
Amn. Mch. Co.....dis 40 %
Torrey's.....dis 40 %
Packer's.....dis 40 %

Ice Creepers.
Safety Reversible.....℘ gross $25 } dis 10 %
Arctic Solid.....℘ gross $30

Ice Tongs.
Champion.....℘ doz $6.00 dis 25&10 %
Family.....℘ doz $2.75 dis 15 %

Kettles.
Brass, 7 to 13 inches inclusive.....℘ ℔ 28c net
Brass larger than 13 inches.....℘ ℔ 32c net

Knives.
Ames' Butcher Knives.....dis 20 %
Ames' Shoe Knives.....dis 15 %
Ames' Bread Knives.....℘ doz $1.50 dis 15 %
Moran's Shoe and Bread Knives.....dis 20 %
Hay and Straw, Wadsworth's.....dis 33⅓
Table and Pocket.....See Cutlery

Knobs.
Carriage (Jap'd 80c ℘ gross).....dis 60&10 %
Base—Common.....dis 30&10 %
Hemacite Door Knobs.....new list, dis 35&5 %
Door Mineral / Door Por. Jap'd / Door Por. Plated / Door Por. } Same discounts as Door Locks.
Furniture Plain.....15c gross inch, dis 10 %
Furniture, Wood Screws.....dis 20 %
Picture, Judd's.....dis 60&10&10 %
Picture, Sargent's.....dis 60&10 %
Hemacite, Picture.....dis 35 %
Shutter, Porcelain.....dis 60&10 %

Ladles.
Melting, Sargent's.....dis 50&10 %
Melting, Reading.....dis 30&10 %
Melting, Monroe's Patent.....℘ doz $4.00 dis 40 %
Melting, P. S. & W.....dis 30&10 %

Lanterns.
Tubular.....No. 0, $8.00; No. 1, $8.25 With Guards 30c extra } net
Nail City.....No. 1 ℘ doz $10; No. 2, $9, net
Meteor.....No. 1, ℘ doz, $9.50; No. 2 $8.50, net
Hurricane, No. 2.....℘ doz $5.75, net
Peerless, No. 5.....℘ doz $11.75, dis 10&10 %
Brady's Patent.....dis 10&10 %
Ætna.....dis 10&10 %
Yankee.....dis 10&10 %
De Beque.....dis 10&10 %
Police Small, $6.25; Med., $7.50; Large, $10.00, net
Convex Reflector.....$2.75 ℘ doz, dis 15 %

Lawn Mowers.
Excelsior and Clipper.....dis 33⅓ %
Pennsylvania.....dis 30 %
Philadelphia.....dis 30 %

Lemon Squeezers.
Porcelain Lined.....℘ doz $6.00, dis 30 %
Wood.....℘ doz 3.00, dis 30 %
Eureka, Tinned.....℘ doz 8.00, dis 10 %
Dunlap's Improved.....℘ doz 2.75, dis 20 %
Sammis'...No. 1, $5 2, $8.40; 12, $15 ℘ doz; dis 25&10 %
Townsend's Patent.....$6 00 ℘ doz, dis 33⅓ %
Jennings "Star".....$2.00 ℘ doz net
The "Boss".....℘ doz $4.00, dis 10&10 %
Dean's Nos. 1, ℘ doz, $15.00; 2, $9.00; 3, $5.00.dis 40&10 %

Lines.—Linen Fish.....dis 25&10 %
Cotton Chalk.....dis 55 %
Silver Lake, Braided, Nos. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ℘ gross.....dis 20 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50.....net
Masons' Colored Cotton.....dis 45 %
Wire Clothes, Galvanized.....each 25c@40c net

Locks and Latches.
Cabinet, Eagle / Cabinet, Gaylord / Cabinet, Bridgeport } Changes made in list price of some numbers Jan. 1, 1881, dis 25&2 %
Cabinet, P. & F. Corbin.....dis 25&2 %
Cabinet, A. E. Deitz.....dis 30 @ 40 %
Cabinet, Stoddard Lock Co.....dis 40&5 %
Trunk, new list, Jan. 1, 1881.....dis 15&2 %
Langstroth & Crane's List, Jan. 1, '77:
Round Key, Nos. 1 to 5.....dis 40&10 %
Round Key, Nos. 5½ to 12.....dis 40&10 %
Flat Key.....dis 33⅓&10 %
A. E. Deitz, Flat Key.....dis 30@40 %
Yale Lock Co., Flat Key.....dis 40 %
"Shepardson" or "U. S.".....dis 35 %
"Felter" or "American".....dis 33⅓ %
Plate.....dis 33⅓&2 %
F. Many's "Extension Cylinder".....$10.50 ℘ doz net
DOOR LOCKS, ETC.
Branford / Norwalk / Norwich / P. & F. Corbin / Russell & Erwin / Mallory, Wheeler & Co. / Whipple Mfg. Co. } See "Trade Report."
Reading Hardware Co. (low list).....dis 40&2 %
Padlocks—Russell & Erwin / Mallory, Wheeler & Co. / Norwich Lock Mfg. Co. / Wm. Wilcox & Co. } dis 30&10 % and 2 % for cash
Yale Lock Mfg. Co.'s "Standard".....dis 40 %
Romer's.....dis 25 @ 40 %
Conestoga.....dis 60 %
Scandinavian (Moore Bros.).....dis 80 %
J. H. McWilliams.....dis 10 %
A. E. Dietz.....dis 35 %
"Star".....dis 45 %

Lustre.—4-oz. bottles, ℘ doz $1.75; ℘ gros $17.00 net

Mallets.—Hickory.....dis 10&10 %
Lignumvitæ.....dis 10&10 %
Penfield Block Co., Lignumvitæ & Hickory...dis 30 %

Meat Cutters.
Dixon's (P.S.&W.) Nos. 1 2 3 4
℘ doz..$14.00 17.00 19.00 30.00—dis 25&5 %
Miles' Challenge.....Nos. 1 2 3
℘ doz..$22.00 30.00 40.00—dis 40 %
Perry's, Nos. 1 2 3 4 4 g'rd 5 g'rd
Each...$3.00 4.00 5.00 11.00 13.00 30.00—dis 25&5 %
Woodruff's (P. S. & W.).....Nos. 100 150
℘ doz..$15.00 18.00—dis 25&5 %
Hales'.....Nos. 11 12 13
℘ doz..$27.00 33.00 45.00—dis 50&10&2 %
Draw Cut..Nos. 5 2 6 8 10
Each..$50.00 75.00 80 00 225.00 400.00—dis 20 %
American.....dis 20&10 %
Nos..... 1 2 3 4 B 5
Each..... $5.00 7.00 10.00 25.00 50.00 60.00
Kieser's No. 55.....$30 ℘ doz dis 40 %
Kieser's Gem.....$25 ℘ doz, dis 40 %
Kieser's Monarch.....$45 ℘ doz, dis 40 %
Kieser's Butcher.....$40 each, dis 20 %
Silver & Deming.....dis 25 %
Pennsylvania.....dis 40&10 %
Nos..... 1 2 3 00
℘ doz.....$24.00 28.00 36.00 28.00
Beef Shavers (Enterprise Mfg. Co.).....dis 20&10 %

Mincing Knives.
Am. (2d quality), ℘ gross, 1 blade, $7 2 blades, $12 3 blades, $18.....net
Lothrop's.....dis 20&10 %
Smith's, ℘ doz, Single, $2.25; Double, $3...dis 33⅓&10 %
Cowles Hdw. Co.....dis 55 %

Molasses Gates.
Stebbins' Patterns.....dis 70&10 %
Stebbins Genuine.....dis 67½&10 %
Stebbins Tinned Ends.....dis 40&10 %
Chase's Hard Metal.....dis 50&10 %
Bush's.....dis 20 %
Lincoln's Pattern.....dis 60&10 %
Weed's.....dis 15 %
Boss Nos. 1 2 3 4
$7.00 8.00 9.00 10.00..℘ doz. dis 60&10&10 %

Nails......See Trade Report
Nuts and Washers...(In lots less than 100 ℔ add ½c to list; 1 ℔. boxes, add 1c to list.)
Square Nuts.....8 c off list
Hexagon Nuts.....8½c off list
Washers.....7½c off list

Nut Crackers.
Table (Humason & Beckley Mfg. Co.).....dis 33⅓ %
Blake's Pattern.....℘ doz $2.00, dis 5 %
Turner & Seymour Mfg. Co.....dis 50 %

Oakum.—is on 100 bales and over ⅛ % ℘ ℔.
Best.....℘ ℔ 9 c
U. S. Navy.....℘ ℔ 8 c
Navy.....℘ ℔ 6¾c

Oilers.—Zinc and Tin.....dis 60 %
Brass and Copper.....dis 50 %
Malleable (Hammer's).....℘ doz. $6.00, dis 10 %
Prior's Patent or "Paragon" Zinc.....dis 60 %
Prior's Patent or "Paragon" Brass.....dis 50 %
Olmstead's, Tin and Zinc.....dis 60 %
Olmstead's, Brass and Copper.....dis 50 %
Broughton's, Zinc.....dis 60 %
Broughton's, Brass.....dis 50 %

Packing, Steam.
N.Y. Belting and Packing Co.....dis 20 %

Pencils.
Faber's Carpenters'.....high list, dis 50 %
Faber's Round Gilt.....℘ gross $5.25, net
Dixon's Lead.....℘ gross $4.50, net
Dixon's Lumber.....℘ gross $6.75, net
Dixon's Carpenters'.....dis 40&10 %

Picks.
Railroad, 5 to 6, $11.00; 6 to 7, $12.00.....dis 45 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00.....dis 45 %

Picture Nails.
Brass Head, Sargent's list.....dis 60&10 %
Brass Head, T. & S. Mfg. Co.....dis 50 %
Porcelain Head, Sargent's list.....dis 50&10 %
Porcelain Head, Judd's list.....dis 40@40&10 %
Porcelain Head, T. & S. Mfg. Co.....dis 40 %
Niles' Patent.....dis 40 %

Pinking Irons......℘ doz 75c, net

Plaiting Machines.
Magic.....℘ doz $10.00, net
Astor Plaiting Machine.....each $15.00, dis 20 %
Crown Plaiting Machines.....dis 25 %
6 in., $6.00; 10 in., $8.00 each.

Planes and Plane Irons.
Bench, First Quality.....dis 20 %
Bench, Second Quality.....dis 25 %
Molding.....dis 15 %
Bailey's (Stanley R. & L.Co.) new list, Jan.'79.dis 20&10 %
The Stanley (S. R. & L. Co.) new list, Jan.'79..dis 20&10 %
Bailey's "Victor".....dis 20&10 %
Defiance Adjustable.....dis 20&10 %
Lafin Mfg. Co.....dis 35 %
Plane Irons, Butcher's.....$5.00 @ $5.25 to £
Plane Irons, Buck Bros.....$5.00 to £
Plane Irons, Auburn Tool Co.....dis 20 & 10 %
Plane Irons, The Globe Mfg. Co., "Baldwin Iron".....dis 20 & 10 %
Plane Iron, Ohio Tool Co.....dis 20&10 %
Plane Irons, Sandusky Tool Co.....dis 20&10 %

Pliers and Nippers.
Button's Patent.....dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $4.50; No. 4, 7 in., $21.00 ℘ doz.....dis 25 %
Humason & Beckley Mfg. Co.....dis 33⅓&10 %
Gas Pliers.....dis 50 %
Eureka Pliers and Nippers.....dis 40 %
Russell's Parallel.....dis 25 %
P. S. & W. Cast Steel.....dis 33⅓&10 %
P. S. & W. Tinners' Cutting Nippers.....add 6 % dis 10 %

Plumbs and Levels.
Disston's.....dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable.....dis 65&10 %
Stanley R. & L. Co.'s Non-Adjustable.....dis 65&10 %
Chapin's Patent Adjustable.....dis 65&10&10 %
Chapin's Non-Adjustable.....dis 65&10&10 %
Standard Rule Co.'s New Adjustable.....dis 65&10 %
Standard Rule Co.'s Non-Adjustable.....dis 65&10 %
Johnson's Patent Adjustable.....dis 65&10 %
Pocket Levels.....dis 65&10 %
Davis' Inclinometers.....dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger.....℘ doz $37.50, dis 20 %
Fletcher Post Hole Augers.....℘ doz $36.00, dis 20 %
Vaughan's Post Hole—6 in., $23.60; 7, 8 and 9 in., $25.00 ℘ doz.....dis 20&10 %
Eureka Diggers ℘ doz $27.00.....net
Leed's each $2.50.....net

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw, ℘ doz $19.00, dis 20 %
Disston's Pruning Hook.....℘ doz $12.50, dis 20 %
E. S. Lee & Co.'s Pruner.....dis 33⅓ %
Pruning Shears.....℘ doz $5.50 @ 6.00
Wheeler, M. & Co.'s Combination.....℘ doz $12, dis 20 %
Dunlap's Saw and Chisel.....℘ doz $5.00, dis 40 %

Pulleys.
Hot House and Tackle.....dis 60&10 %
Jap'd Screw.....dis 60&10 %
Brass Screw.....dis 70&10 %
Jap'd Side.....dis 60&10 %
Jap'd Clothes Line.....dis 60&10 %
Hay Fork, Solid Eye.....$4.50; Swivel, $5.00, dis 50&10 %
Hay Fork, "Anti-Friction".....$6.75, dis 10&10 %
Hay Fork, "F" Common and Pat. Bushed.....dis 20 %
Hay Fork, Tarbox Pat. Iron.....dis 20 %
Shade Rack.....dis 15 %

Punches.
Belt or Drive.....℘ doz $2.00; 2.25 2.50, dis 50 %
Bemis & Call Co.'s Cast Steel Drive.....dis 40&5 %
Bemis & Call Co.'s Springfield Socket.....dis 50&5 %

Spring.....₩ doz $7.00, dis 50&7½ %
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid, Tinners'.....₩ doz $1.44, dis 40 %

Rail.
R. Sliding, Door, Wrought Brass... ₩ ℔ 43c, dis 30 %
Sliding Door, Bronzed Wrt. Iron....₩ foot 12c. dis 35 %
Sliding Door Iron, Painted.....₩ foot 4c. dis 10&10 %
Barn Door....inch..... ⅜ ½ ⅝
Per 100 feet $2.00 3.00 5.00—dis 10 %
B. D. for N. E. Hangers—
Small. Med. Large.
Per 100 feet.....$2.10 2.70 .30—net
Terry's Wrought Iron, 500 ₩ foot.....net

Razors.
J. R. Torrey Razor Co.....dis 15 %

Razor Strops.
Genuine Emerson.....dis 45 %
Badger's Emerson.....dis
Badger's (not Emerson).....dis 33⅓ %
Imitation Emerson.....₩ doz $2.00, dis 20 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 to 2 %
Saunder's.....dis 10 %
Torrey's.....dis 20 %

Rivets.
Iron and Tinned, new list, Dec. 10, 1881.....dis 40 %
In bulk, new list, Dec. 10, 1881.....dis 40 %
Copper Rivets and Burrs.....dis 50 %

Nos..	7	8	9	10	11	12	13	14	15
₩ ℔..	49c	50c	52c	54c	56c	58c	60c	64c	70c

Rivet Sets......dis 33⅓&10 %

Rods.
Stair, Brass.....dis
Stair, Black Walnut.....60c. ₩ doz. dis

Rollers.
Barn Door, Sargent's list.....dis 6c&10&10 %
Acme (Anti-Friction).....dis 50 %

Rope.
Mnfs' List, May 16, 1883.....dis 1c ₩ ℔
Manila.....¼ inch and larger ₩ ℔ 15½c
Manila.....⅜ inch ₩ ℔ 16 c
Manila.....⅝ and 5-16 inch ₩ ℔ 16½c
Manila, Tar'd Rope.....₩ ℔ 15 c
Manila, Tar'd Lath Yarn.....₩ ℔ 15 c
Manila, Hay Rope.....₩ ℔ 13½c
Sisal.....½ inch and larger ₩ ℔ 11 c
Sisal.....⅜ inch ₩ ℔ 11½c
Sisal.....¼ and 5-16 inch ₩ ℔ 12 c
Sisal, Hay Rope.....₩ ℔ 11 c

Rules.

	Boxwood.	Ivory.
Chapin's, Standard, Stanley	dis 70&10 %	dis 45&10 %
Stephens	dis 70&10 %	dis 45%

Cast Irons.
From 4 to 10.....₩ ℔ 3½c net
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Doubled Pointed.....dis 35 %
Mrs. Pott's Irons, Square Back.....dis 35 %
Enterprise Star Irons, new list, July 20, 1882...dis 35 %
Combined Flutor and Rad Iron....₩ doz $15.00, dis 15 %
Chinese Laundry (N. E. Butt Co.).....65c, dis 15 %
New England.....50 dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1¾..$4.75 ₩ ream
Baeder & Adamson's Flint, 2, 2½ & 3.. 4.25 ₩ ream
Baeder & Adamson's Flint, Assorted. 4.75 ₩ ream
Baeder & Adamson's Star..... 3.75 ₩ ream
Baeder & Adamson's Emery..₩ ream $6.50 @ 11.50
Bartles Flint.....$4.75&$6.25 ₩ ream dis 35 %
Bartles Harrison, $3.75 ₩ ream.....dis 35 %
New England, same list as B. & A. Flint.....dis 35 %
Gage's.....dis 30&5 %

Sash Cord.
Common.....₩ ℔ 13c net
Patent.....₩ ℔ 15c net
Silver Lake, Hemp.....₩ ℔ 9c, dis 10&5 %
Silver Lake, White Cotton.....₩ ℔ 9c, dis 10&5 %
Silver Lake, Drab Cotton.....₩ ℔ 8c, dis 10&5 %
Raw Hide, ₩ foot, ¼ in., 5c.; 5-16 in., 7c.; ⅜ in., 10c.
.....dis 15 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00 ₩ gr.08..dis 15 %
The Perfect, Clark & Smith, Plain Jap. ₩ gro. $10.00 net
The Perfect, Clark & Smith, Por. K'd Jap. ₩ gro. $14 net
The Perfect, Clark & Smith, N-Plated..₩ gro. $27.00 net
"Universal".....dis 10 %

Sash Weights.
Solid Eyes, in 600 ℔ lots and over.....₩ ℔ 2½cnet

Sausage Stuffers or Fillers.
Miles "Challenge".....₩ doz $20, dis 40 %
Perry.....₩ doz, No. 1½; No. 0, $21, dis 25&5 %
Draw Cut No. 4.....each $30.00, dis. 20 %
Enterprise Mfg. Co.....dis 20&10 %
Silver's.....dis 25 %

Saws.
Disston's Circular, Mill and Cross Cut.....dis 40 %
Disston's Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning Cross Cuts, new list.....dis 40 %
Boynton's Circular and Mill.....dis 40 %
Boynton's Ice.....dis 25 %
Boynton's Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 30 %
W. M. & C. Mfg. Co. Cross Cuts.....dis 30 %
Livingston's Butcher and Kitchen.....dis 20 %
Livingston's Framed Wood—

Nos	101	102	103	104	105
Per doz.	$10.00	8.50	10.00	7.50	6.20 net

Peace Circular and Mill.....dis 40 %
Peace Hand, Panel and Rip.....dis 25 %
Peace Cross Cuts.....dis 35 %
Peace Band Saws, all widths.....dis 10 %
Richardson's Circular.....dis 40 %
Richardson's Mill and X Cut.....dis 40 %
Richardson's Hand Panel, Butcher and Web Saws.....dis 25 %

Saw Frames.
White, Vermont.....₩ doz $1.50. dis 25&10%
Red, Polished and Varnished.....₩ doz $1.50, dis 10%
Saw Rods.....$10 list, dis10 & 10%

Saw Sets.
Boynton's Patent X Cut, per doz, $12.00; Hand Saw per doz, $10.00.....dis 25 %
Stillman's Genuine.....₩ doz $3.50 and $5.00 dis 10 %
Stillman's Imitation.....₩ doz $3.25, dis 50&10 %
Common Lever.....₩ doz $2.00, dis 50&10 %
Leach's.....No 0, $8.00; No. 1, $15.00, dis 15 %
Nash's.....dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent.....dis 30&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 50&10 %
Aiken's Imitation.....$7.00, dis 50 %
Hart's Patent Lever.....dis 30 %
Disston's.....dis 20 %
Morrill's.....No. 1, $15 No. 0, $12, dis 40&5 %

Scales.
Hatch, Counter, No. 271.....₩ doz $42, dis 45 %
Hatch, Tea, No 161.....₩ doz $14.00, dis 45 %
Union Platform.....$6.00, dis 45 %
Fairbanks'.....dis 20 %
Richlé Bros.....dis 20 & 10 %
Buffalo Scale Co.....dis 20&5 %
Forsyth Scale Co.....dis 25 %
Howe's.....dis 20&10 %
Chatillon's Grocers'.....dis 40 %
Chatillon's Eureka.....dis 25 %
Family Universal, 12 ℔, $30; 24 ℔, $36.....net
Family Favorite.....dis 30 %
Family, Turnbull's.....dis 30 %
Scale Beams, List of January 12, 1882.....dis 33⅓&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.50, dis 20&10 %
Box 1 Handle.....₩ doz $4.00, dis 10 %
Box 2 Handle.....₩ doz $6.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 45&10 %
Ship, common.....₩ doz $3.50 net
Ship, Providence Tool Co.....dis 10 %

Screen Corners.
Porter's Pat Windowand Door Frame.....dis 33⅓

Screw Drivers.
Douglas Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros.....dis 25 %
Stanley Rule & Level Co.'s, Varnished Hdls..dis 60&10 %
Stanley Rule & Level Co.'s, Black Handles..dis 50&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet
₩ doz, 4 in., $9.00; 5 in., $10.20; 6 in., $12.00—dis 35 %
Mallett & Co.'s Double Action Clutch
₩ doz, 4 in., $7.00; 5 in., $8.00; 6 in., $9.00—dis 15 %
Champion.....dis 25 %
Clark's Patent.....dis 25 %

Screws.
Flat Hd Iron, new list, Dec. 27, 1882.....dis 50&10 %
Round Head Iron, new list, Dec. 27, 1882.....dis 45&10 %
Flat Head Brass, new list, Dec. 27, 1882.....dis 50&10 %
Round Head Brass, new list, Dec. 27, 1882.....dis 45&10 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 50&10 %
Coach, Patent Gimlet Point, 50&10 %, by the keg, dis 70 %
Coach, Common or Lag.....dis 50&10 %
Bed.....dis 10 %
Machine, Flat Head, Iron.....dis 45 %
Machine, Round Head, Iron.....dis 60 %
Bench, Iron.....dis 55&10 %
Bench, Wood, Beech.....₩ doz $3.00, dis 10 %
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 20&10 %
Hand Rail, Sargent's.....dis 60%&10 %
Hand Rail, Humason, Beckley & Co.'s....dis 60%&10 %
Hand Rail, Am. Screw Co., list of Jan. 1, '81.....dis 70 %
Jack (Wilson's).....dis 25 %

Screw Window Balances.
R. H. Huguniin's. No. 1, $2.10; No. 2, $1.75; No. 3 $1.60.....₩ doz net

Scroll Saws.
Lester, $18.00.....dis 25 %
Rogers, $3.50.....dis 25 %

Shears and Scissors.
American (Cast) Iron.....dis 70&70&10 %
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....add 6 %, dis 10 %
Seymour's, List, Dec., 1881.....dis 50 %
Heinsch's, List, Dec., 1881.....dis 50 %
Heinsch's Tailor's Shears.....dis 33⅓ %
Miss. Cutlery Co. St. Trimmers.....dis 75 %
Wiss, J., & Sons' list, Dec., 1881.....dis 50 %

Sheaves.
Sliding Door, M. W. & Co. list.....dis 40&2 %
Sliding Door, R. & E. list.....dis 60&10&2 %
Sliding Door, Patent Roller.....dis 60&10&2 %
Sliding Door, Patent Roller, Hatfield's.....dis 60&10&2 %
Sliding Door, Russell's Anti-Friction.....dis 60&10&2 %
Sliding Door, Moore's Anti-Friction.....dis 60 %
Sliding Shutter, R. & E. list.....dis 60&10&2 %
Sliding Shutter, Sargent's list.....dis 50&10 %
Sliding Shutter, Reading list.....dis 50&10 %
Sash Cord's Anti-Friction (Hanging).....dis 50 %

Shovels and Spades.
Ames, New list, July 1, 1881.....dis 15 %
Griffiths.....dis 50 %
Old Colony.....dis 15 %
Payne Pettebone & Son, new list.....dis 40&10 %
Payne Pettebone & Son, R. R. Shovels.....dis 15 %
Remington's (Lowman's Patent).....dis 30 %
Rowland's.....dis 50&5 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 60&20&2 %
Iron and Brass Head, P. S. & W.....dis 60%&10 %
Polished Steel, new list.....dis 50&10&2 %

Slates.
Square Frames, by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.), new list.....dis 30&10 %
Stearns'.....dis 30&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00, dis 40&5 %
Stearns'.....₩ doz $9.00, dis 20&10 %
Ives'.....No. 1, $14.00; No. 2, $12.00 ₩ doz, dis 15&10 %
Douglass'.....₩ doz $5.00, dis 15 %

Spoons.
Basting.....dis 60&10 %
Riveted Table and Tea.....dis 60&10 %
Solid Table and Tea.....dis 60&10&5 %
Britannia.....dis 60&10 %
Reed & Barton.....dis 40&10&5 %
Holmes, Booth & Haydens.....dis 40&10&5 %
German Silver.....dis 30&10&5 &
Cast Steel, Silver Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
Tin (P. S. & W.), Tables.....$2.00 ₩ gross, net
Tin (Cowles Hdw. Co.).....dis 10 %
Tin (Cowles Hdw Co.), case lots.....dis 20 %

Stocks and Dies.
"Lightning" Screw Plate.....dis 10 %

Stone.
Hindostan No. 1, 6c; Axe, 8c.....dis 40 %
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ ℔ 6c, dis 33⅓&10 %
Washita Stone.....No. 1, ₩ ℔ 18c net
Washita Stone.....No. 2, ₩ ℔ 16c net
Washita Stone, Slips.....No. 1, ₩ ℔ 37c net
Arkansas Stone No. 1, 4 to 6 in.....₩ ℔ $1.35 net
Arkansas Stone No. 1, 6 to 9 in.....₩ ℔ $2.00 net
Turkey Oil Stone (Chase).....4 to 8 in., ₩ ℔, 60c, dis 10 %
Turkey Slips (Chase).....$1.75 ₩ ℔ dis 10 %
Lake Superior (Chase).....₩ ℔ 16c, dis 10 %
Lake Superior, Slips (Chase).....₩ ℔ 90c, dis 10 %
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $6.00, dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 4 %
Lustro.....₩ gross $4.75, net
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ ℔ 8c, net
Boynton's Noon Day ₩ gross No. 1, large, $4.50 No. 2, small, $3; No. 3, medium, $4.

Squares.
Steel.....dis 50 %; full cases, dis 50&10 % } 2 % cash
Iron.....dis 50 %; full cases, dis 50&10 % }
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net }
Try Square and T Bevels.....dis 50&10 %
Disston's Try Square and T Bevels.....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %

Tacks, Brads, &c.
New List, Sept. 1, 1882.

Tinned Swedes Tacks	dis 30 %
Tinned American Tacks	dis 30 %
Swedes Tacks, all kinds	dis 30 %
American Cut Tacks	dis 30 %
Copper Tacks and Nails	dis 30 %
Swedes Hungarian Nails	dis 35 %
Gimp and Lace Tacks	dis 30 %
Gimp and Lace Tacks, Tinned	dis 30 %
Finishing Nails	dis 25 %
Trunk and Clout Nails	dis 25 %
Common and Patent Brads	dis 25 %
Basket Nails	dis 20 %
Brush Tacks	dis 20 %
Leathered Carpet Tacks	dis 20 %
Cigar Box Nails	dis 20 %
Chair Nails	dis 20 %
Double-pointed Tacks	dis 40& 5%

Extra 10 % on all.

Tap Borers.
Common and Ring.....dis 20 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20&10 %

Tapes, Measuring.
American.....dis 20 %
Spring.....dis 25&10 %
Chesterman's.....regular list dis 20@25 %

Thermometers.
Tin Case.....dis 75&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20&10 %
Wood Bottom.....₩ doz $10.00, dis 25&10 %
All Iron.....₩ doz $8.25, dis 15 %
Nashua Lock Co.'s.....₩ doz $18.00 dis 50&5 %
Wilson's.....dis 35 %
Clipper (Sargent & Co.).....₩ doz $18.00, dis 20 & 10 %

Toe Calks.
Winsted.....₩ ℔ 9c, dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 20 % } dis 10 %
Tools (P. S. & W.).....add 6 % }

Transom Lifters.
Wollenak's Patent.....dis 35 %
Reliher's Patent, new list, Feb., 1882.....dis 20&10&10 %
Excelsior.....dis 50&10&2 %

Traps.
Game, Newhouse.....dis 35 %
Game, Oneida Pattern.....dis 60 %
Game, Blake's Patent.....dis 40&5 %
Mouse, Wood, Choker.....₩ doz holes, 14c
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-em-alive.....₩ doz $2.50, dis 10 %
Mouse, "Bonanza".....per gross $10.00 net
Rat, "Decoy".....₩ doz $10.00, dis 10 %

Trowels.
Lothrops' Brick and Plastering.....dis 25 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 25 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 25 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 55 %
Butter and Cheese.....dis 25 %

Trucks (Warehouse, &c.
Penfield Block Co.'s list, 1882.....dis 35 %

Vises.
Solid Box.....dis 35 %
Solid "Crown" (A. H. Hildick).....40 to 100 ℔, 15c net
Solid, Peter Wright's.....15½c
Solid, Wilkinson's.....14@15c
Parallel, Parker's.....dis 10 %
Parallel, Wilson's.....dis 35&10 %
Parallel, Howard's.....dis 20&10 %
Parallel, Merrill's.....dis 15 %
Parallel, Sargent's.....dis 50&10 %
Parallel, Backus and Union.....dis 60 %
Parallel, Oval Slide.....dis 40 %
Parallel, Double Screw Leg.....dis 15&10 %
Parallel, Prentiss.....dis 25 %
Parallel, Simpson's Adjustable.....dis 25&5 %
"Family," List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
Saw Filers, Stearn's.....dis 20&10 %
Saw Filers, Hopkins'.....₩ doz $17.50, dis 10 %
Saw Filers, Reading.....dis 20&10 %
Cowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00, dis 25 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ doz Pol. $17.50; Jap'd, $16.50, dis %
Appleton's.....₩ doz $16.00, dis 50&10 %

Washers.—See Nuts and Washers.

Well Wheels.....dis 60&10 %

Wire.

Brass and Copper	dis 30 %
Market, Bright and Annealed	dis 52½ @ 55 %
Market, Coppered	dis 47½ @ 50 %
Market, Galvanized	dis 42½ @ 45 %
Market, Tinned, Tinned list	dis 45 @ 47½ %
Stone, Bright and Annealed, Nos 0 to 18	dis 55 @ 57½ %
Stone, Bright and Annealed, Nos. 19 to 26	dis 60 @ 62½ %
Stone, Bright and Annealed, Nos. 27 to 36	dis 65 @ 67½ %
Stone, Galvanized, Nos. 19 to 30	dis 42½ @ 45 %
Stone, Tinned, Tinned list	dis 45 @ 47½ %
Tinned Broom Wire	dis 55 @ 57½ %
Cast Steel Wire	dis 45 @ 47½ %
Annealed Fence, Nos. 8 & 9	dis 52½ @ 55 %
Annealed Grape, Nos. 10 to 14	dis 52½ @ 55 %
Fence Staples	₩ ℔ 5½ @ 6½c
Fence Staples, Galvanized	₩ ℔ 6½ @ 8½c
Stubs Steel Wire	$5.00 to 5 dis 30 %
Japanned Barb Fence	₩ ℔ 3 c
Galvanized Barb Fence	₩ ℔ 3 c
Steel Music Wire, Nos. 7 to 20	$1.00 ₩ ℔
Picture Wire, T. S. & J.	dis 40 %
Clothes Line Wire, Galvanized	₩ coil 25 @ 40c net
Wire Cloth, green, drab and black,	₩ sq. ft., 2½c, net

Wrenches.

American Adjustable	dis 40 %
Baxter's Adjustable "S," list Jan., 1880	dis 20&5 %
Baxter's Diagonal	dis 20&5 %
Coes' Genuine	dis 40&3 %
Coes "Mechanics"	dis 50&10&3 %
Coes' Pattern, Malleable	dis 75 %
Coes' Pattern Wrought	dis 60 @ 66 %
Girard Standard	dis 60 %
Girard Agt.	dis 70 %
Bemis & Call's Patent Combination	dis 30 %
Bemis & Call's Merrick 's Pattern	dis 35 %
Bemis & Call's Brigg's Pattern	dis 25 %
Bemis & Call's Cylinder or Gas Pipe	dis 40 %
Van Wagoner & Williams' Basin	₩ doz $4.50
Aiken Pocket (Bright)	$6.00, dis 50&10 %
The Favorite Pocket (Bright)	₩ doz $4, dis 40 %
Webster's Patent Combination	dis 25 %

Wringers.

	Per doz.	
Universal, XX, No. 2½	49.00	2 doz. in a box.
Universal, XX, No. 2	45.00	
Universal, XX, No. 1½	41.00	
Universal, XX, No. 1	36.00	1 doz. in a box.
Peerless, no Cogs, No. 1	42.00	
Peerless, with Cogs, No. 2½	45.00	
Peerless, with Cogs, No. 2	48.00	
Peerless, with Cogs, No. 3	54.00	
Peerless, with Cogs, No. 4	66.00	
Eureka, No. 2	42.00	
Novelty No. 2, for Common Tubs	33.00	
Novelty No. 3, for Common Tubs	30.00	
Excelsior No. E, for Stationary Tubs	42.00	
Excelsior No. F, for Stationary Tubs	57.00	
Excelsior No. A, with Folding Bench	60.00	
Excelsior No. B, with Folding Bench	54.00	

Lots of 1 doz., dis 25 & 5 %. Lots of 5 doz., dis 25 & 10 %.

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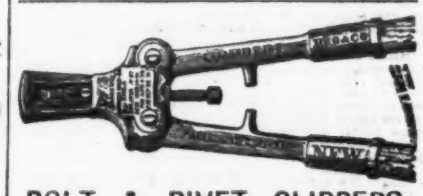

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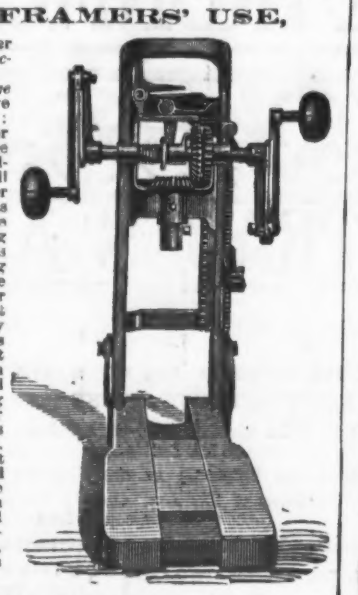

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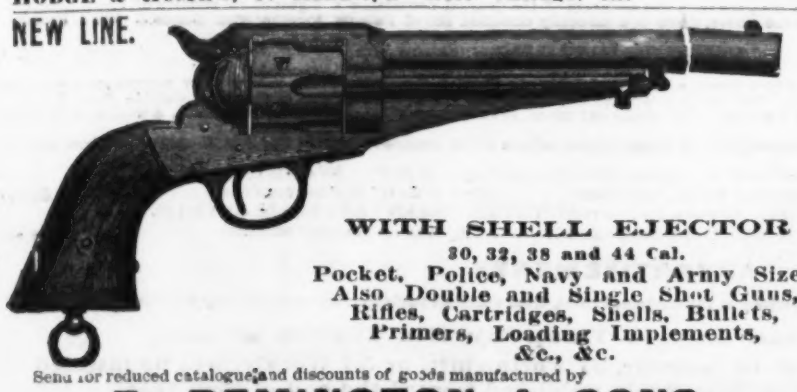

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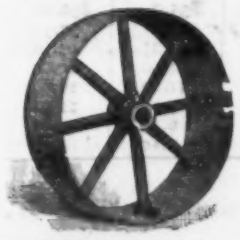

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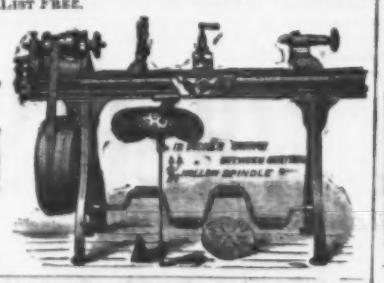

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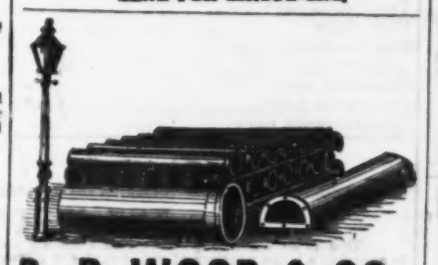

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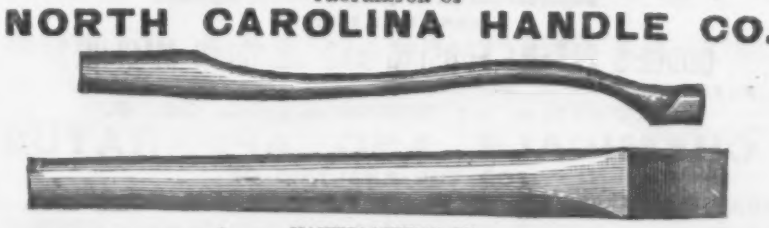

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Bay State Peach Parer.....$9 00

Axes.
Hunt's Kentucky and Yankee, per doz.....$8.50 @ 9.00
Robert Mann.....$8.00 @ 8.40
Richland Chief....." $7.50 @ 8.00
Beveled Axes....." add 50c net
Double Bit Axes.....net " $14.50 @ 15.40

Augers and Auger Bits.—New List January 7, 1880.
Bates' Nut Augers.....dis 45&10 %
Cook's Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 15 %
Benjamin Pierce Auger Bits.....dis 40 %
Griswold Auger Bits.....dis 45&10 %
Cook's " .....dis 40&10 %
Jennings' " .....dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $18 ₱ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $45 ₱ doz..dis 20&10 %

Balances.
Light and Common.....dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells.....dis 70 %
Swiss Pattern Hand Bells.....low list dis 40&10 %
Connell's Door Bells.....dis 15 & 10 %
Gt. Western & Kentucky Cow new list.....dis 60 %

Boring Machines
Upright, without Augers.....List 5.50
Angular, without Augers....." 6.75 } dis 45@50 %

Bolts.—Eastern Carriage Bolts.....dis 80 @ 80 & 10 %
Philadelphia " ....new list dis 70&10 %
Stanley, Wrought Shutter.....dis 50&10 %

Braces.—Barber's.....dis 40&5 %
Backus.....dis 50 %
Spofford.....dis 50&5 %
American Ball.....dis 55 %

Butts.—Cast Fast Joint, Narrow.....dis 45&10 %
" " Broad.....dis 45&10 %
Cast Loose Joint, Narrow.....dis 55&10 %
" " Broad.....dis 55&10 %
" Acorn, Loose Pin.....dis 50&10 %
" " " Jap'd.....dis 60&10 %
" Hayer's Loose Joint.....dis 60&10 %
Wrought Loose Pin.....dis 55&10 %
" Table Hinges and Back Flaps...dis 50&10 %
" Narrow, Fast.....dis 50&10 %
" Loose Joint.....dis 55&10 %

Blind Butts.
Parker.....dis 70 & 2 %
Clark.....dis 70 & 2 %
Shepard.....dis 70 %
Lull & Porter.....dis 70&10 %
Huffer's.....dis 40 %

Chains.—German Halter and Coil, list December 31, 1881.....dis 45@ 50 %
Galvanized Pump.....₱ ℔ 9½c net
Best Proof Coil Chain—English.

₱ ℔	13	10	8½	7½	7¼	7	gold
	3-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing.....dis 65&10 %
Socket Firmer.....dis 65&10 %
Butcher's.....$5.00 to £ gold

Casters.—Bed (new list July 1, 1880).....dis 45@50 %
Plate.....dis 40@40 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880.....dis 45 %
Enterprise.....dis 25 %

Cutlery.—Walden Pocket.....new list net
Penna. Knife Co.....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s.....dis 65&10 %
Adjustable Handle.....dis 30 %

Fry Pans.
Tinned.....dis 45 %

₱ doz.	$3.40	4.00	4.50	5.00	5.50	6.40	7.50	9.00	10.00
No.	0	1	2	3	4	5	6		8

Burnished.....dis 60, 10 & 5 %

₱ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
Fo.	0	1	2	3	4	5	6	7	8

Flies.
Nicholson.....dis 50 %
Disston.....dis 50 %
Butcher.....

Fluting Machines.
Eagle—3½ in. roll.....each, $2.15 } dis 25 %
—5½ in. roll....." 2.85 }
Crown—3½ in. roll....." 3.50 }
—6 in. roll....." 4.00 } dis 25 %
—8 in. roll....." 6.50 }
Geneva Fluter.....dis 25 %
Favorite com Fluter & Sad Iron.....₱ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list.....dis 30 %
Maydole Hammers.....dis 15 %
Howell A. E. Nail Hammers.....per doz. net $3.75

Handles.
Disston Loop Handles Crosscut.....33c pair net
Boynton Loop Handles Crosscut.....33c pair net

Hatchets.
Yerkes & Plumb, new list.....dis 30 %
Hunt.....dis 25 %

Hinges.
Strap and T.....dis 55 & 10 %

Horse Nails. Nos. 5 6 7 8 9 10
Globe.....24 21 19 18 17 16 dis 12½ %
Vulcan.....26 23 21 20 19 18 dis 12½ %
Ausable.....30 27 25 24 23 22 dis 30&10 %
" Pol'ed and P't'd & glued & P't'd..31 28 26 25 24 23 dis 30&10%
Clinton.....23 21 20 19 18 dis 30&10%
" Polished & Pointed.24 22 21 20 19 dis 30&10%

Hay and Straw Knives.
Lightning.....per doz. net $18.00
Electric.....
Wadsworth.....
Walton Straw Knives.....17.00

Locks and Knobs.
Branford.....new list dis 45, 10& 2 % cash
Gaylord Cabinet.....dis 25&2 % cash
American Padlocks.....dis 30, 10&2 % cash
Scandinavian Padlocks.....dis 40 %

₱ doz..	$5.00	5.50	6.50	7.50	8.50	10.00	12.50	} dis 60 %
No.....	57	58	59	60	61	62	63	
₱ doz.....	$12.00			26.00		33.00		} dis 60 %
No.....	64			65		66		

Lanterns.
Buckeye.....Large list net; small list net
Tubular.....No. 0, $8.65; No. 1, $10.15 ₱ doz net
Guards, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania.....
Philadelphia.....
Excelsior.....
} new list dis 30 %

Lawn and Garden Pumps.
Holland Patent.....List $5.00 dis 10 %

Matlocks.
Long and Short Cutter.....new list.....45 %
Pennsylvania Pattern.....dis 4 %

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 30 %
Stebbins' Gates.....dis 70&10%
Lincoln's " .....dis 60&10 %
Landers, Frary & Clark's Petroleum.....dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880.....dis 45 %
Cork Lined " .....dis 70 %

Meat Cutters.
Dixon's.....dis 25&5 %
Woodruff.....dis 25&5 %
Stowe.....dis 25&5 %
Hale's.....new list, dis 50, 10&2 cash
American.....dis 25 %
Stuffers.....dis 25&5 %
Enterprise Stuffers.....dis 25 %

Planes.—Sandusky Tool Co.....dis 20 %
Ogonts.....dis 25 %
Ohio & Auburn.....dis 20 %
Bailey (S. L. & L. Co.).....dis 20&10 %

Plane Irons.—Ohio Tool Co.....dis. 20 %
Butcher's.....$5.00

Plumbs and Levels.
Stanley's Adjustable.....dis 65&10 %
" Non-Adjustable.....dis 65&10 %

Picks.—New list.....40 %

Razor Strops.
Lamont Combination.....per doz. $4.00
" .....1 gross lots $42.00
Imitation Emerson.....per doz. 2.00

Rules.—Stanley Boxwood.....dis 70 &10 %
Stanley Ivory.....dis 50&10 %

Steelyards.—Hart's Pattern.....dis 33⅓&10 %

₱ doz.....	$14.50	17.75	21 00	26.50	31 00	35.40
Lbs.....	50	100	150	200	250	300

American Pattern.....dis 33⅓&10 %

₱ doz.....	$8.00	10.25	13.75	14.50	18.75	19.50
Lbs.....	50	100	150	200	250	300

Squares.
Steel and Iron...dis 40 ; full case, dis 50&10&2 for cash
Try Squares, Stanley.....dis 50&10 %
Disston's Try Squares.....dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz $9.00
Clipper No. 10, Bronzed Blade, Boxed and Sharpened.....₱ doz $8.50 } 30
Clipper No. 5, Painted Red, Boxed and Sharpened.....₱ doz $8.00 }

Saws.—Disston's Hand, Panel and Rip.....dis 20 %
Disston's Circular.....dis 40 %
Cross-Cut No. 2, Plain Tooth.....dis 40%
" Patent Tooth.....dis 40%
" Champion Tooth.....dis 40%
Boynton's Lightning Cross Cut, new list.....dis 40 %
" Lightning Buck Saws, cross bar...dis 40 %

Shovels and Spades.
Oliver Ames & Sons, new list.....dis 15 %
Griffiths.....dis 50@50&5%
Rowland.....dis 50@50&5%
Sad Irons.—4 to 10 lbs.....₱ ℔ 3½c
Mrs. Potts' Patent.....dis 35 %

Sieves.
Washita Extra.....₱ ℔ 18c net
" No. 1.....16c
" No. 2.....15c
" Slips.....37c
" Axe.....13c net

Hindostan Oil Stone No. 1.....₱ ℔ 6c } dis 33⅓ %
Axe Stone.....50 }
Slips.....100 }

Screws.
Flat Head Iron, new list Dec. 27.....dis 40 & 10%
Flat Head Brass, new list Dec. 27.....dis 50 & 5 %
Round Head Brass, new list Dec. 27.....dis. 40 & 10 %
Round Head Iron, new list Dec. 27.....dis. 45 & 10 %

Spoons.
Plated.....dis 40, 10 & 5 %
German Silver.....dis 30 & 10 %
Britannia, Boardman's.....dis 60 %
" Parker's.....dis 60&10 %

Tinned.....dis 10 %

Springs.—Torrey.....dis 50 %
Gem No. 3 small Jap'd.....$2.00 } dis 50 & 10 %
" No. 2 medium Jap'd.....2.75 }
Coil No. 10, per gross net.....$6.00
Other Standard Springs.....dis 50&10 %
Warner Door Springs, per doz. net.....1.75
Standard Spring Hinges—
Single No. 0, per doz. net.....1.25
" No. 1, " " 1.50
Other Standard Spring Hinges.....dis 25&10 %

Stocks and Dies.....dis 10&2 %

Stove Polish.—Gem.....₱ gross, $1.50, dis 5 %
Dixon.....6.00, dis 10%
Fire Fly.....$3.00 gross net

Tacks.....dis 30&10 %
Shoe Nails—4-8, and over 8c..... } 10 %
" " 3½-8, and under 9c..... }
Double Pointed Tacks.....dis 40&2 %

Traps.
Genuine Oneida—Newhouse.....dis 35 %
Im. Oneida—Newhouse list, first qual. dis 55&5 @ 60 %

Vises.—Solid Box, Tremton new list.....dis 25 %

Wrenches.—Agricultural.....dis 70 %
Coes' Genuine.....dis. 50&2½ %
Coes' Mechanics'.....dis. 50&10&2½ %
" " Mail. Bar.....dis 25 %

Wire.
Bright or Ann'd, No. 0 to 18.....dis 52½ to 55 %
" No. 19 to 26.....dis 60 to 62½ %
" No. 27 to 36.....dis 64 to 67½ %
Coppered, 0 to 18.....dis 47½ to 50 %
Tinned Broom Wire.....dis 55 to 57½ %
Galvanized Barb Wire.....90dis
Painted Barb Wire.....80
Galvanized No. 7 to 18....Market List, dis 42½ to 45 %

Wringers.
Peerless No. 2½.....$42.00
" No. 2.....45 00
Universal No. 2½.....42.00
" No. 2.....45.00
Novelty No. 2, for common tubs.....42 00
" No. 3, " " 48.00
Excelsior E, for stationary tubs.....51.00
" F " " 57 00

In lots of 1 doz. $3.00 doz. dis. from above price.

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.

1½ to 4 by ⅛ to 1 inch.....2.25c
4½ to 6 by ⅛ to 1 " 2.60
1⅝ to 6 by 1⅛ to 1¾ " 2.90
1¼ and 1⅛ by ⅛ to ¼ " 3.60
1 and 1⅛ by ⅛ to ¼ " 2.70
⅝, ¾ and ⅞ by ⅛ to ¼ inch.....2.90

Rounds and Squares.

1 to 1⅞	2.25c	⅜ to 9-16	2.70
2 to 2⅝	2.70	⅝ to 7-16	2.90
2⅝ to 3¼	3.00	½	3.10
3⅜ to 4	3.50	5-16	3.30
4¼ to 4	4.00	¼	3.40
⅞ to ⅞	2.80	3-16	5.50

Double Pointed Tacks.....dis 40&2 %

Oval Iron.

⅞ to 1¼	2.90	⅜	3.30
⅝ to ¾	3.10	¼ inch	3.70

Half Oval and Half Round.

⅞ to 1¼ inch	3.20	¼ inch	4.00
⅝ to ⅞ "	3.70	⅜ "	5.50

Horse Shoe.

⅝ to 1¼ by 5-16 to ⅞ inch.....3.40

Wagon Box Iron.

¼ Inch, Nos. 13 and 14.....3.70
⅜ " " 11 and 12.....3.50
⅜ " " 13 and 14.....4.00
⅜ " " 11 and 12.....3.80
⅜ " " 13 and 14.....4.40
⅜ " " 11 and 12.....4 10

Heavy Bands.

3¼ to 6 by ¼ and 5-16 inch.....2.70
1⅛ to 3¼ by ¼ and 5-16 " 2.70
1 to 1⅛ by ¼ and 5-16 " 2.80
¼ to ⅜ by ¼ and 5-16 " 3.00
⅝ and ⅜ by ¼ and 5-16 " 3.50

Light Bands.

1¼ to 6 by ⅛ to 3-16 " 3.00
1⅛ to 6 by Nos. 11 and 12.....3 10
1 to 1⅛ by ⅛ to 3-16.....3.10
1 to 1⅛ by Nos. 11 and 12.....3.20
⅛ and 13-16 by ⅛ to 3-16.....3.40
⅛ and 13-16 by Nos. 11 and 12.....3.50
⅝ and 11-16 by ⅛ to 3-16.....3.70
⅝ and 11-16 by Nos. 11 and 12.....3.80
⅝ and 9-16 by ⅛ to 3 16.....3.90
⅝ and 9-16 by Nos. 11 and 12.....4.10
⅝ inch by ⅛ and 3-16.....4.30
⅝ inch by Nos. 11 and 12.....4.40

Hoop Iron.

1¼ to 4, Nos. 13, 14 and 15.....3.50
1¼ to 2, Nos. 16, 17 and 18.....3.40
1¼ to 2, No. 19.....3.50
1¼ to 2, No. 20.....3.60
1¼ to 2, No. 21.....3.70
1¼ to 2, No. 22.....3.80
1⅛-16 1, and 1¼, Nos. 13, 14 and 15.....3.50
1⅛-16. 1, and 1¼, Nos. 16, 17 and 18.....3.60
1⅛-16. 1, and 1¼, Nos. 19 and 20.....3.70
1⅛-16. 1, and 1¼, No. 21.....3.80
1⅛-16. 1, and 1¼, No. 22.....3.90
⅞, Nos. 13, 14 and 15.....3.70
⅞, Nos. 16, 17 and 18.....3.80
⅞, Nos. 19 and 20.....3.90
⅞, No. 21.....4.00
⅞, No. 22.....4.10
1⅛-16, Nos. 13, 14 and 15.....3.90
1⅛-16, Nos. 16, 17 and 18.....4.00
1⅛-16, Nos. 19 and 20.....4.10
1⅛-16, No. 21.....4.20
1⅛-16, No. 22.....4.30
1¼, Nos. 13, 14 and 15.....4.00
1¼, Nos. 16, 17 and 18.....4.10
1¼, Nos. 19 and 20.....4.20
1¼, No. 21.....4.30
1¼, No. 22.....4.40
11-16, Nos. 13, 14 and 15.....4.10
11-16, Nos. 16, 17 and 18.....4.20
11-16, Nos. 19 and 20.....4.30
11-16, No. 21.....4.40
11-16, No. 22.....4.50
⅞, Nos. 13, 14 and 15.....4.20
⅞, Nos. 16, 17 and 18.....4.30
⅞, Nos. 19 and 20.....4.40
⅞, No. 21.....4.50
⅞, No. 22.....4.60
⅞, No. 23.....4.70
9-16, Nos. 13, 14 and 15.....4.30
9-16, Nos. 16, 17 and 18.....4.40
9-16, Nos. 19 and 20.....4.50
9-16, No. 21.....4.60
9 16, No. 22.....4.70
9-16, No. 23.....4.80
⅝ inch, Nos. 13, 14 and 15.....4.40
⅝ " Nos. 16, 17 and 18.....4.50
⅝ " Nos. 19 and 20.....4.60
⅝ " No. 21.....4.80
⅝ " No. 22.....4.90
⅝ " No. 23.....5.00

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.

1¼ to 2 in., cut to length.

9 to 11 lbs. per set of 6 hoops.....3.90
8 lbs. and less than 9 lbs. per set of 6 hoops.....3.60
Less than lbs. per set of 6 hoops.....3.80

Extras for Cutting to Length all Preceding Iron.

All Iron, including Tire.....1.10c

Tank Iron.

No. 9 and heavier.....3.30
Plow Slabs.....3.50
" Wings.....3.80

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 20 to 24	3.40	4.00	6.50
No. 25 to 27	3.80	4.30	6.80
No. 28 to 31	4.10	4.60	7.10
No. 32 to 34	4.50	4.80	7.30
No. 35 & 36	4.90	5.00	7.50
No. 27	4.70	4.90	7.70
No. 28	4.80	5.00	8.10

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.

1st quality (A).....10½c | 2d quality (B).....9 c

Galvanized C. H. B.—(Charcoal Hammered Blooms.

Nos. 14 to 20	12c	No. 27	15c
Nos. 21 to 24	13c	No. 28	16c
Nos. 25 and 26	14c	No. 29	18c

42½ & 45 % discount.

Coal Screen Iron.

1¼ by ¼ by 4-16.....3.00c | 1 by ⅛ by 4-16.....3.50

Angle Iron.

1¼, 1½ and inch.....3.30
1¼, 1½ 2 and 2¼ inch.....3.30
1¼ inch.....3.40
1 " 3.60
1¼ by 1 in. for Plow Handles.....3.80
1¼ by ¼ " " 3.80
1¼ by ⅝ " " 3.90

T Rail.

3 lbs. to the yard.....2.9c | 20 lbs. to the yard.....2.8c
12 " " .....2.8c | 28 " 2.8c
16 " " .....2.8c | 30 " 2.8c

Splice Joints for 12, 16 and 20-lb. Rail, 400 each; 28 and 30 lb. Rail, 500 each: 40 lb., 600 each.

3¼ by ⅝ and ¼ Spikes for 20 and 28-lb. Rail.....4½c
2¾ and 3 by ⅝ " " 12 and 16-lb. " 4½c
2¾ by 5-16 " " 8-lb. Rail.....5½c

Flat Rails.—Punched and Countersunk.

1¾ to 2 by ¼ to ⅝ inch.....3.00
1¾ by ⅜ and 7-16 inch.....3.20
1¾ by ⅞, 7-16 and ½ inch.....3.40

Juniata Nail Rods.....6.0c
Norway " 8.0c
Guard Iron, 4x½x⅛ and 4x⅝x⅛.....4.00
" 4x⅝x5-16 and 4x⅝x¼.....4.20
Drag Bars.....3.30
Dropper Bars.....3.80
Cylinder and Landside Iron.....3.20
Plow Beam Iron.....4.00

Nails.

See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.

⅛ to 2 inches, inclusive.....11c
1-16 and 2⅛ to 3 inches.....12c
¼ and 3⅛ to 4 " 13c
7-32 and 4⅛ to 5 " 14c
5-16 and 5⅛ to 6 " 17c
5-32 inch.....22c
⅛ inch.....30c
Oil Well Steel Forgings.....30c

Machinery Steel.

	Crucible.	Bessemer & Open Hearth
Ordinary Sizes, ⅛ to 2 inch	7c	5c
Round	7c	5c
5-16 and 2⅛ to 3 inches	8c	6c
¼ and 3⅛ to 6 "	9c	7c
7-32 inch	10c	8c
3-16 "	12c	10c

Square, Flat and Octagon, ½c extra throughout the list.

Cut to specified lengths, ½c extra.

Hammer Cast Steel.

Crucible Cast Steel.....8½c
Open Hearth Cast Steel.....7c

Sheet Steel.—Crucible.

To 21 gauge.	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
	12c	11c	9c	7c

1c. extra for each additional gauge.

Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Auger and Auger Bit.....8½c
Axle Steel for carriages and wagons.....8½c
Frog Points and Plates.....10c
" Side Bars.....8½c
Pick, plain (hammered).....10c
" and Mattock, beveled (rolled).....8½c
Skate Steel.....9c
Table Cutlery, plain.....7c
Table Cutlery, beveled.....7½c
Pike and Cant Hook.....8½c
Coal and Granite Wedge.....8½c
Roller.....8½c
Spindle, subject to Machinery classification.....8½c
Trap Spring Steel.....10c
Forged Crank Pins and Lathe Spindles.....11c
Piston Rods, plain.....8½c
" forged to shapes.....11c
Slide Bars, plain.....8½c
" forged to shapes.....11c

Crucible, Open Hearth or Bessemer.

Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick.....6½c
Boiler, Fire-Box and Flue Sheets, not less than ¼ thick.....7½c
Circulars and semi-circulars, when ordered separately.....8c
Smoke Stack, to shape.....8c
Locomotive Tank Steel.....7c

File Cast Steel.

Square, Round, Half Round and Flat Bastard, 8-inch and over.....8c
Mill Saw, 8-inch and over.....8½c
Taper, 3½-inch and over.....9½c
Horse and Shoe Rasp.....9½c

Spring Cast Steel.

Spiral and Taper, cut to lengths.....8½c

Tire Cast Steel.

1x⅛ and over.....8½c
1x3-16, ⅝x3-16 and ¼.....9c
1 and 1x10x⅛ and 5-32, ⅝x3-16 and 5-32.....9½c
¼ and ⅝x⅛ and 3-32 and 12 g.....10c
Solid Sale Cast Steel.....7½c
Three and Five Ply Cast Steel.....10c

Agricultural Implement Cast Steel.

Fork and Rake, Crucible.....8c
Horse Rake Steel, cut to lengths, Crucible.....8c
Hoe, Crucible.....8c
Corn Stalk Cutter, beveled.....7½c
Beveled Hoe and Shovel Steel in Bars.....9½c
Crucible Plow Steel in slabs.....8½c

Bessemer and Open Hearth.

Spring.....4½c
" spiral and taper, cut to lengths.....6½c
Tire, ⅜-16 thick and above.....4½c
Toe Calk.....4½c
Plow.....4½c
Axle Billets.....4½c
Sleigh Shoe.....4c
Cutter Shoe, cut to lengths and tapered.....4c
Scythe Back Steel.....5½c
Grain Drill Bars.....4c
" Points.....7½c
Rolling Coulter Blanks, cut and punched.....8½c
Thrasher Steel.....9½c
" Teeth.....4½c
Rolled Hammer Billets.....5½c

Terms.—Four months; 2 per cent. discount for cash if remitted within 30 days.

Rolls and Castings.

Furnace Floor and Straightening Plates.....2 c
Housings and Castings not otherwise specified.....3 c
Guide Plates.....3½c
Spindles and counting boxes.....3 c
Sand Rolls and Pinions, large size.....3 c
" small size.....3½c
Pine Mill Castings.....3½c
Rolling Mill Castings under 50 lbs.....4 c
Spur and Bevel Wheels, large.....2 c
" small.....4½c
Pulleys up to 30 inches.....4½c
" over 30 inches.....4½c
Engine Castings, light.....4 c
" heavy.....4½c

Cotton Rolls.

6 to 10 in. diam.,	to 20 in. long	.8c
8 to 15 in. "	8 to 40 in. "	.9c
25 to 24 in. "	25 to 72 in. "	4½c
14 to 21 in. "	72 to 108 in. "	4½c

After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

White and Red Lead.

Strictly Pure White Lead in Oil, in kegs, 6½c.; in 25 ℔ Tin Pails, ½c. ₱ ℔ over keg price; 12½ ℔ Tin Pails, 1c ₱ ℔ over keg price; assorted, 1 to 5 ℔ cans, 50c. per ℔ over keg price.

Dry White Lead in barrels.....6½c
Red Lead, very brilliant, in kegs, 6½c; in barrels 6¼c
Litharge (Potter's Lead) " 6½c
Freights equalized with all points where White Lead is made.

Terms: Note at sixty days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.

Discount, 70 % on Single Strength, 70 & 10 % on Double.

Single Strength.

Size.	AA.	A	B.	C.
6 x 8 to 10 x 15	9.25	7.50	6.00	5.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
16 x 40 to 30 x 50	15.00	14.00	11.25	10.25
30 x 42 to 30 x 54	16.00	14.50	12.00	
30 x 56 to 34 x 56	17.25	14.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	

Double Strength.

6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.00	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 58 to 34 x 60	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 80	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hubbard, Bakewell & Co.'s Goods.

Axes, Single Bit, Lippincott.....Per doz. $11.00
" " James & Co....." 7.00
" Double Bit, Lippincott....." 15.00
" " James & Co....." 12.00
Drain Tools, list.....dis 20%
Hoes, Planters'.....dis 55%
" Scovill Pattern.....dis 55%
" Handled, Square Eye, German.....dis 25%
Handles, Cross Cut.....Per doz. $3.50
" Shovel, Bent, Bored, Riveted..." 2.40
Saws, Circular.....dis 40%
" Long.....dis 40%
" Cross Cut, H. B. & Co., Champion, Per ft. net.....$0.35
" Cross Cut, Lippincott, Champion, Per ft. net.....30
Shovels, list.....dis 20%
Spades, " .....dis 20%
Scoops, " .....dis 20%

BOSTON.

Reported by Macomber, Bigelow & Dowse.

Anvil & Vise.—
No. 1, $4.25; 2, 4.25; 3, 3.50 each ..... dis 25 %

Augurs & Bitts.—Snell's Auger ..... dis 40&10 %
L'Hommedieu's Ship Auger ..... dis 25 %
Jenning's Bitts ..... dis 30&10 %
Cook's Bitts ..... dis 40&10 %
Shepardson's Double-Cut Bitts ..... dis 45 %
Shepardson's Double Gimlets ..... dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₩ doz., $48.00; No. 3, ₩ doz., $60.00 list ..... dis 20 %
Bonney's Extension Hollow Augers ..... ₩ doz $36.00
Pierce's Bitts ..... dis 50 %
Griswold Bitts ..... dis 60 %

Axes.—Blue Jackets ..... ₩ doz $9.00
Red Cross ..... ₩ doz 8.00
Red Cross Handled ..... ₩ doz 12.00
Dowse Handled Boys' ..... dis 33⅓ %

Ax Handles.—
Oak Extra, 31 in., No. A ..... ₩ doz $2.50
Oak Extra, 34 in., No. A ..... ₩ doz 2.50
Oak Extra, 31 in., No. B ..... ₩ doz 2.00
Oak Extra, 34 in., No. B ..... ₩ doz 2.00
Oak Extra, 31 or 34 in., No. C ..... ₩ doz 1.40

Axle Clips ..... dis 50 %
Balances.—Chatillon's ..... dis 33⅓ %

Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers) ..... ₩ ft. 20
Cast Half Round ..... ₩ ft., ⅝, 30; ¾, 40
Wrought Round ..... ₩ ft., ⅝, 30; ¾, 40; ⅞, 50

Bells.—Connel's Crank Gong, reduced list ..... dis 15&10 %

Bird Cages.—
Japanned M. B. & D., reduced list, 1879 ..... dis 40 %
Brass M. B. & D., reduced list, 1879 ..... dis 33⅓ %

Blind Fasts.—Lock Fasts ..... ₩ C sets $6.00
No. 5 Fasts ..... ₩ C sets 6.00
Veazie Fasts ..... ₩ C sets 6.00
Shedd's ..... ₩ C sets 7.00

Blind Hinges.—Mall, Hook, 3 holes ..... ₩ C sets 7.00

Brad Awl Handles.—
Phœnix Adjustable ..... ₩ doz $2.00

Bolts.—Norway Iron Carriage ..... dis 75 %
Common Iron Carriage ..... dis 50 & 10 %

Borax.—Refined ..... ₩ lb 14c

Boring Machines.—
Eagle Upright each ..... $5.50 list } dis 40&10 %
Eagle Angle each ..... 6.75 list }
Snell Augers ..... ₩ set $2.45

Braces.—Barber's ..... dis 40&5 %
Spofford's ..... dis 40&5 %
Backus' ..... dis 50&5 %

Bracket Saws.—Holly Scroll Saw ..... each $2.25
Demas Lathe and Scroll Saw ..... each 6.50
Bracket Saws, extra quality, to No. 5 ..... ₩ gro 0.75
Steel Frame, with patterns ..... ₩ doz 4.50
Lester ..... dis 20 %
New Rogers, all iron ..... dis 25 %

Bracket Saw Blades.—Griffith's pat ..... ₩ gross 7.00

Brackets.—
R. B. & M. Flower Pot, reduced list ..... dis 15&10 %
Bronzed Shelf, M. B. & D., new list ..... dis 50 %
Store Shelf ..... dis 40 %

Butts.—Union Fast Joint ..... 40&10 %
Union Loose Joint ..... dis 45&10 %
Union Japanned Acorn ..... dis 55&10 %
Union Silvered Acorn ..... dis 65&10 %
Union Boston Finish ..... dis 70&10 %
Union Spiral Spring ..... dis 25&10 %
Wrought Brass ..... dis 60& 10s

Carriage Bolts.—Eagle Norway ..... dis 70&10 %
Common ..... dis 60 & 5 %

Carriage Jacks.—Climax No. 1 ..... ₩ doz $30.00
Climax No. 1½ ..... ₩ doz 15.00
Climax No 2 ..... ₩ doz 13.50
Universal ..... dis 25 %
Universal No. 1 ..... each $2.00
Universal No. 2 ..... each 3.00
Universal No. 3 ..... each 4.00
Universal No. 4 ..... each 6.00
Universal No. 4½ ..... each 6.40

Cartridges.—U. S. Cartridge Co ..... dis 75 %

Cards.—
Watson's make Horse & Curry ..... dis 10 % } New List,
Watson's Cotton ..... dis 10 % } July, 1881.
Watson's Wool ..... dis 10 % }

Casters.—Bed and Table ..... dis 50 %

Chain.—Traces 6/4, 10, 4, straight ..... ₩ pair 50c
Traces 6/4, 10, 4, twisted ..... ₩ pair 45c
Traces 7, 12, 3, twisted ..... ₩ pair 80c
Coil 3/16 ..... ₩ lb 10½c
Coil ¼ ..... ₩ lb 8½c
Coil 5/16 ..... ₩ lb 7c
Coil ⅜ ..... ₩ lb 6½c
Coil 7/16 ..... ₩ lb 6c
Coil ½ ..... ₩ lb 5½c

Chalk.—White, Carpenter's ..... ₩ gross 50c
Red, Carpenter's ..... ₩ gross 80c
Blue, Carpenter's ..... ₩ gross $1.00

Chisels.—Hart, Blivens & Mead, Framing ..... dis 50&10&10%
Underhill, Framing ..... dis 25 %
Buck's Chisels ..... dis 50 %

Clothes Line.—
Galvanized Wire, 100 feet each ..... ₩ doz $4.00

Coal Hods.—"Dover."—Galvanized, New List ..... dis 60%
Japanned, new list ..... dis 50 %

Coffee Mills.—New List ..... dis 45 %

Copper Rivets ..... dis 40 %

Cow Ties ..... dis 33⅓ %
No. 30, 3 ft. No. 6 Wire, with toggle ..... ₩ doz $3.80
No. 34, 3 ft. No. 6 Wire, with snap ..... ₩ doz 4.00
No. 40, 3½ feet No. 6 Wire, with toggle ..... ₩ doz 4.20
No. 45, 3½ ft. No. 6 Wire, with snap ..... ₩ doz 4.40
No. 50, 4 ft. No. 4 Wire, with toggle ..... ₩ doz 4.75
No. 55, 4 ft. No. 4 Wire, with snap ..... ₩ doz 5.00
No. 60, 4½ ft. No. 3 Wire, with toggle ..... ₩ doz 5.00
No. 65, 4½ ft. No. 3 Wire, with snap ..... ₩ doz 5.80

Cocks.—Brass. L. F. & Co ..... dis 40&10 %

Cordage.—Manila, usual trade dis 10 ..... ₩ lb 15½c
Jute ..... ₩ lb 9c

Crow-Bars.—Cast Steel ..... ₩ lb 7½c
Iron, Steel-pointed ..... ₩ lb 4c

Cutlery.—Pocket American Shear Co.'s ..... dis 40 %
Butcher Knives, Wood's, Lap Bolster, Square Handle ..... dis 30 %
Steak Knives ..... dis 25 %
Lap Bolster, Oval Handle ..... dis 20 %
Sticking ..... dis 20 %
Skinning ..... dis 30 %
Butcher, Common Round Handle, Wood's ..... dis 20&5
Shoe Knives, Wood's ..... dis 20 %

Dividers.—Cook's ..... dis 25 %

Dog Collars ..... dis 20 %

Door Springs.—Torrey's Rod ..... ₩ doz $1.62
Imitation Torrey's Rod ..... ₩ doz 1.45
Gem Coil, new list ..... dis 50 & 10 %
Crown ..... ₩ doz 1.25
Warner's ..... ₩ doz 2.00

Door Stops.—Thurston's ..... dis 50 %

Drawer Knobs.—Thurston's ..... dis 50 %

Drills.—Morse Bitt Stock ..... dis 25 %
Morse Straight Shank ..... dis 20 %

Emery.—Wellington Mills ..... ₩ lb 10c
Walpole Emery Mills ..... ₩ lb 6c
Turkish in 10 lb cans ..... ₩ lb 8c

Enameled Ware.—
Standard Mfg. Co. Kettles ..... dis 40 & 10 %
Standard Sauce Pans ..... dis 30 %

Felloe Plates.—Wrought ..... ₩ lb

Files.—American File Co ..... dis 50 %
Nicholson File Co ..... dis 40 %

Fluting Machines.—Knox list, $4.00 ..... dis 20 %
American list, $3.40 ..... dis 20 %

Forks.—W. C. & Co. Manure ..... dis 50 %

Gimlet Bits.—
Genuine German, No. 12s, 1-32 to 8-32, per doz $1.00
Pierce's ..... per doz .80

Glass Cutters.—Combination Glass Cutter and Knife Sharpener ..... ₩ doz $1.00

Grub Hoes.—K. P. & Co.'s No. 2, $11.40 ₩ doz. dis 40 %

Hammers.—Maydole's ..... dis 15 %
Hartford Hammer Co ..... dis 20 %

Hangers & Rollers.—Anti-Friction ..... dis 50 %
Acme Rollers ..... dis 50 %
Climax ..... dis 50 %
Common Hangers ..... dis 50 %
Common Rollers ..... dis 40 %

Hand Screws ..... dis 10 %

Hatchets.—C. F. Dowse new list ..... dis 33⅓ %
Underhill ..... dis 30 %

Hay Knives.—Lightning ..... ₩ doz. $10.00, net
Fisher's Patent ..... ₩ doz $14.00

Hinges.—Strap and T (new list) ..... dis 50 %
Providence Plate ..... ₩ lb 5 %
Wrought Screw Hook ..... ₩ lb 5 %

Hoes.—W. C. & Co.'s ..... dis 60

Hooks and Staples.—Brewers' (new list) ..... dis 60

Horse Nails

	No. 6	7	8	9	
National Finished	.23	.21	.20	.15	dis 30 %
Putnam Pointed	.24	.22	.21	.20	5 %
Bridgewater	.21	.19	.18	.17	list

Ice Cream Freezers.—Packer's, new list ..... dis 40 %

Knobs.—"Norwalk." New list ..... dis 45 %
Silver Glass ..... dis 50&10 %
Silver Glass Bell Pulls ..... dis 60&10 %

Lanterns.—Tubulars, No. 0 ..... ₩ doz 8.00
Railroad, Oil, No. 43 ..... ₩ doz 9.00
Triangular ..... ₩ doz 4.00

Lawn Mowers.—The "Daisy."
12 in. cut ..... each, $8.00
14 in. cut ..... each. 8.50
16 in. cut ..... each. 9.00
18 in. cut ..... each. 9.50

Lead.—Sheet ..... ₩ lb 7¼c
Pipe ..... ₩ lb 6¾c

Locks.—Norwalk ..... dis 45 %
Eagle Cabinet ..... dis 25 %
Eagle Trunk ..... dis 15 %
W. Wilcox & Co., Padlocks ..... dis 30 %

Manure Forks.—W. C. & Co ..... dis 50 %

Mattocks.—
K. P. & Co., Long Cutter, $16.00 ₩ doz ..... dis 30 %
K. P. & Co., Short Cutter, $15.50 ₩ doz ..... dis 30 %
K. P. & Co., Pick Cutter, $16.00 ₩ doz ..... dis 30 %

Measuring Tapes.—Eddy's ..... dis 20 %

Meat Cutters.—Miles' Challenge ..... dis 30 %
Hale's, (new list) ..... dis 40 & 10 %
American ..... dis 25 %

Money Drawers.—Tucker's Am ..... ₩ doz $22.50

Mouse Traps.—Delusion ..... ₩ doz 1.40
Novelty ..... ₩ doz

Nails ..... ₩ keg 3.40

Oilers.—Zinc and Tin ..... dis 60 %
Brass and Copper ..... dis 50 %

Ox Bows.—Extra finished and varnished ..... dis 10 %
1¼ in., ₩ doz. pair ... $7.00 | 2 in., ₩ doz. pair, $10.00
1⅜ in., ₩ doz. pair ... 9.00 | 2½ in., ₩ doz. pair . 12.00

Paper.—Tarred Sheathing ..... ₩ lb 2½c
Tarred Eagle Brand ..... ₩ lb 2½c

Picks.—K. P. & Co., Adze Eye, 5 to 5 lb $12.00 ... dis 50 %
K. P. & Co., Adze Eye, 6 to 7 lb $13.00 ..... dis 50 %

Planes.—
Fancy Planes ..... dis 15 %
Razee Planes ..... dis 20 %
N. Y. Tool Co ..... dis 25 %
English Iron ..... dis 20 %
Bailey's ..... dis 20&10 %

Plated Ware.—Rogers & Bro ..... dis 40&5 %

Pliers.—Vom Cleff & Co.'s ..... net list
Button's Wire Pliers ..... dis 33⅓ %

Plumb & Levels.—Stanley R. & L. Co ..... dis 60&10 %

Pocket Knives.—American Shear Co.'s ..... dis 40 %

Potato Diggers.—W. C. & Co., reduced list ..... dis 60 %

Pulleys.—Acme or Excelsior, 2¼ in ..... ₩ doz 24c
Acme or Excelsior, 2 in ..... ₩ doz 27c

Pulley Blocks ..... dis 35 %

Pumps.—Union Manufacturing Co.
Iron Cistern ..... dis 40 %
Iron Pitcher Spout ..... dis 45 %
Copper ..... dis 30 %

Rivets.—Black (new list) ..... dis 40 %
Carriage in 10 lb papers (new list) ..... dis 40 %
Copper ..... dis 33⅓ %

Razors.—Torrey's ..... dis 30 %

Razor Straps.—Torrey's ..... Full line

Rules.—Stanley, Boxwood ..... dis 70 &10 %
Stanley, Ivory ..... dis 35&10 %

Sad Irons.—Common ..... ₩ lb 3½c
Laundry ..... ₩ lb 6½c
Tailors' Geese ..... ₩ lb 6 c
Enterprise, "Potts" ..... dis 35 %

Sash Locks.—King & Hutchinson's, new list ..... dis 40 %

Sandpaper.—Baeder & Adamson ..... dis 30 %
M. B. & D ..... dis ½ %

Sash Weights.—Patent Eyc ..... ₩ lb 1½c

Saws.—Hand Saws, Disston's ..... dis 20 %
Wheeler & Clemson ..... dis 20 %
Cross-Cut Saws.
W. M. & Co., Common Tooth, No. 1 ..... ₩ foot 35c
W. M. & Co., Champion Tooth ..... ₩ foot 35c
Disston's, Common Tooth ..... ₩ foot 60c dis 40 %
Disston's Great American Tooth ..... ₩ foot 60c dis 40 %
Boynton's Light ing Tooth ..... ₩ foot 45c
M. B. & D., Hand Saws ..... dis 33⅓ %
W. M. & Co.'s Circular Saws ..... dis 35 %
Richardson Bros ..... dis 25 %

Saw Blades.—Disston ..... dis 20 %
W. M. & C ..... dis 10 %
Welch & Griffith, Extra ..... ₩ doz $8.10
Welch & Griffith, No. 2 ..... ₩ doz 7.00

Scales.—Fairbanks ..... dis 20 %

Screws.—Aiken's Flat-Head Iron new list, dis 40 & 10 %
American Flat-Head Iron ..... new list, dis 40 & 10 %
American Flat-Head Brass ..... new list, dis 40 & 10 %
American Round-Head Brass ..... new list, dis 40 & 10 %
American Round-Head Iron ..... new list, dis 45 & 10 %
Grilley Round Head Nickel-Plated Common ..... dis 40 %

Scythes.—Clippers, in boxes ..... ₩ doz 85.75
Shaves.—Kimball's ..... ₩ inch 7½c
Watrous ..... dis 15 %
Shears.—American shear Co., new list ..... dis 70 %
Shot.—Tatham's ..... ₩ lb 7c
Shovels.—O. Ames, new list ..... dis 15 %
O. Ames, other brands, new list ..... dis 15 %
M. B. & D ..... dis 15 %
Sinks.—Magee Patent ..... dis 30 %
Snow Shovels $4.00
Skates.—Union ..... dis 20 %
Acme ..... dis 20 %
Imperial Club list No. 5, $3.75 ₩ pair; list No. 7, $6.00 ₩ pair ..... dis 20%

Stocks and Dies.—King's ..... dis 10&5 %

Tacks.
Swedes Tinned ..... dis 30&10 %
Swedes Iron ..... dis 30 & 10 %
Gimp and Lace ..... dis 20 & 10 %
Copper Tacks ..... dis 30 & 10 %
All balances on list ..... dis 20&10 %

Traps.—Oneida, Genuine ..... dis 33⅓ %
Oneida, Imitation, H. & N ..... dis 50 %
Blake's ..... dis 40&10 %

Vises.—Simpson's Adjustable ..... dis 20&5 %
Howard Vise Co ..... dis 25 %
Prentiss' ..... dis 20 %

Weather Strips.—Packer's ..... ₩ doz $4.50
Browne's Flexible Rubber ..... dis 30 %
In 25 feet boxes: No. 1, ⅜ in. wide, ₩ yard, 10c.; No. 2, ½ in., 14c.; No. 3, ⅝ in., 20c.; No. 4, 1 in. 30c
Black Walnut Spring Weather Strips ..... ₩ doz $3.00

Window Springs ..... d'z 25½ %
Babcock's No. 3 ..... ₩ gross $8.36
Babcock's No. 4 ..... ₩ gross 4.18

Wire Cloth.—"Clinton" ..... ₩ ft

Wire Fence.—Scutt's Patent, Painted ..... ₩ lb 7½c
Scutt's Patent, Galvanized ..... ₩ lb 8½c

Wire Goods.—Gate Hooks and Eyes, &c., dis 50&10 %

Wrenches.—A. G. Coe's ..... dis 50 %
Girard Mfg. Co ..... dis 50 & 10 %
Girard Agt ..... dis 60 & 10 %

Wringers.—
Novelty No 2 for Common Tubs ..... ₩ doz 42.00
Novelty "3 " " " ..... ₩ doz 48.00
Excelsior E " Stationary Tubs ..... ₩ doz 51.00
Excelsior F " " " ..... ₩ doz 57.00
Excelsior A with Folding Bench ..... ₩ doz 59.00
Excelsior B " " " ..... ₩ doz 65.00

$3.00 per doz dis if ordered in not less than 1 doz lots, and $6 per doz dis if ordered in not less than 1 doz lots.

Novelty Set Tub, E ..... ₩ doz 90.00
Keystone, Wood Frame No 1½ ..... ₩ doz 39.00
Keystone, Iron Frame No 2½ ..... ₩ doz 57.00
Zinc ..... ₩ lb 6½c

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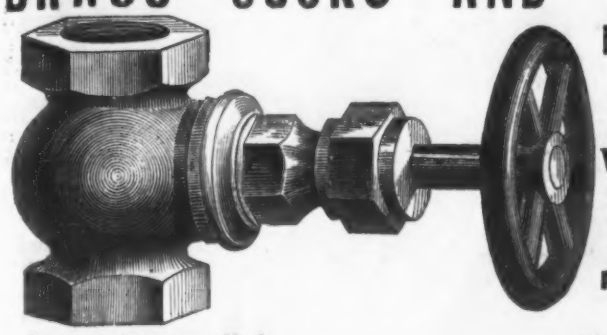

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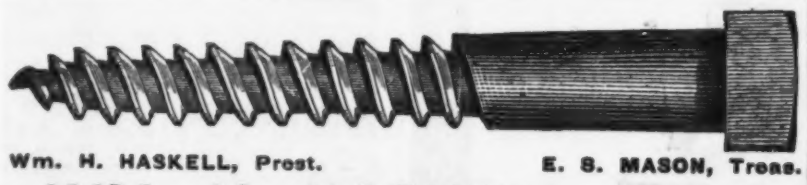

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TAP BOLTS.

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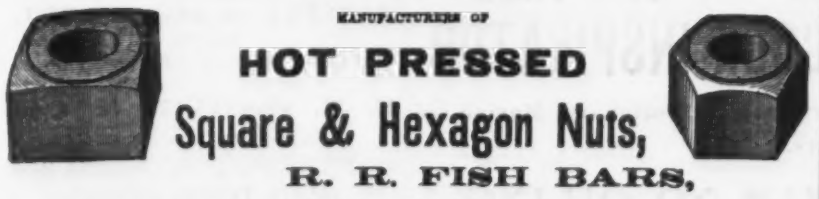

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SPIKES.

RIVETS, &c.

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NORWAY IRON FANCY HEAD BOLTS,

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Butchers' Cleavers,
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BRONZE AND BRASS BEARINGS AND ORNAMENTAL CASTINGS.
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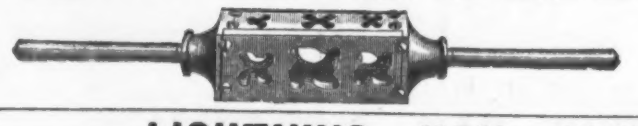
DEANE'S PATENT SOLID STOCKS AND DIES.



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WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving *universal* satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it *seems destined* to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

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Double and Single Gate, ⅛ in. to 48 in.—outside and inside Screws, Indicator, &c. for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

HARCOURT PATENT.

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Also a full line of every variety of TACKLE BLOCKS.

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WOOD POLISHING WHEELS,
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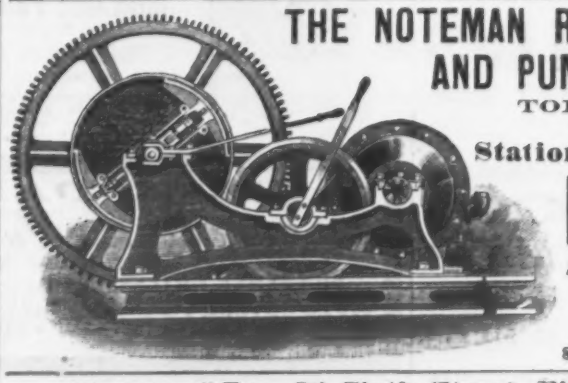

Western Office, 36 Sixth Street, Pittsburgh, Pa.

BLAKE CRUSHER CO.,

New Haven Conn.

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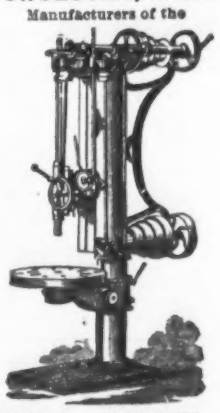

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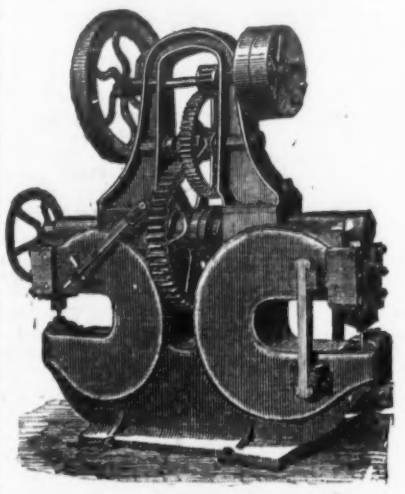

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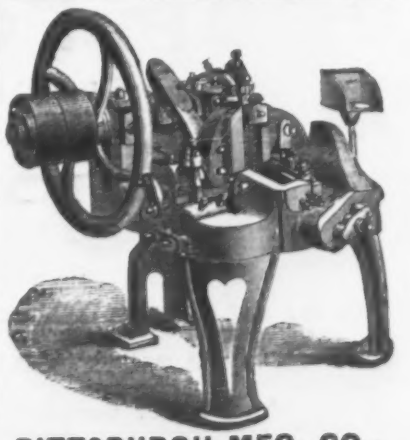

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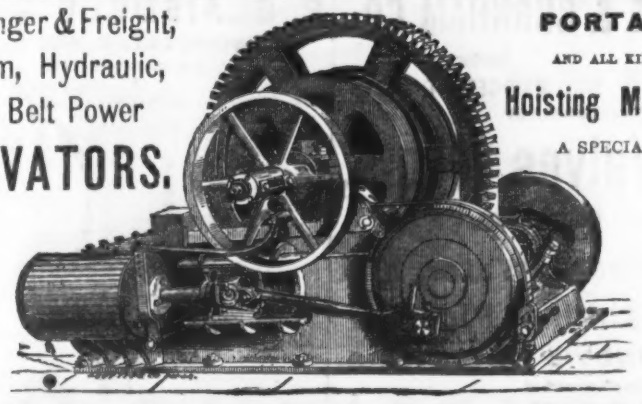

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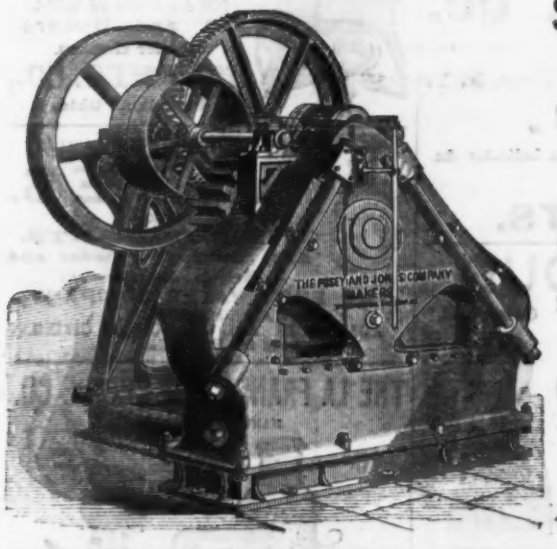

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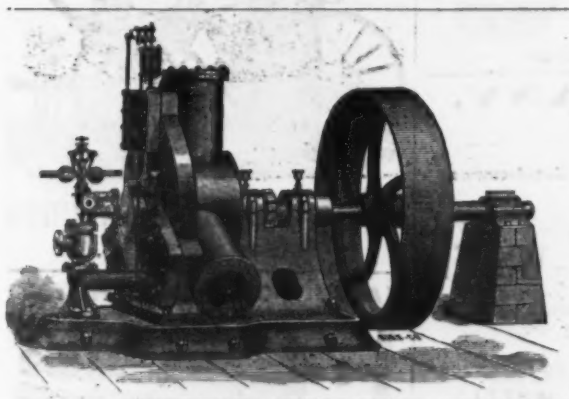

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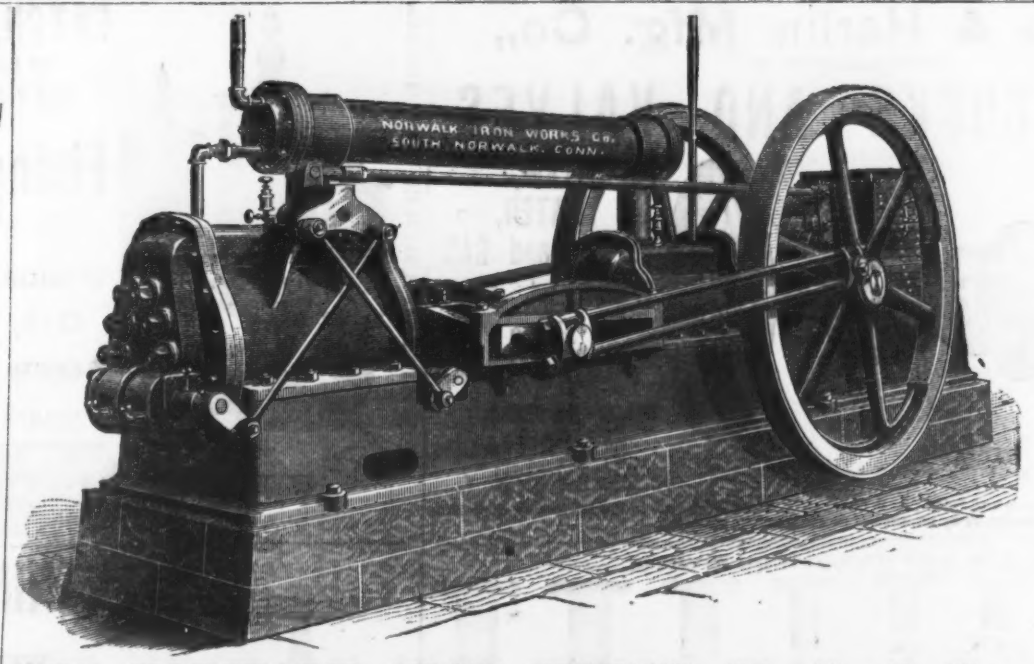

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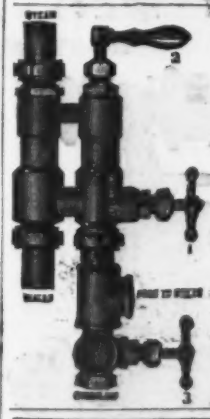

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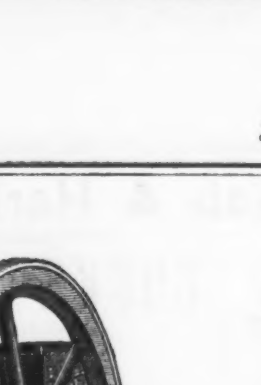

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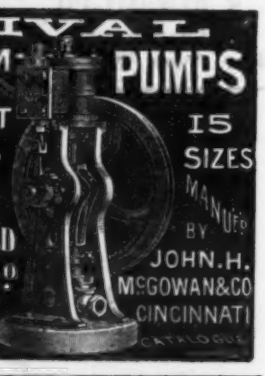

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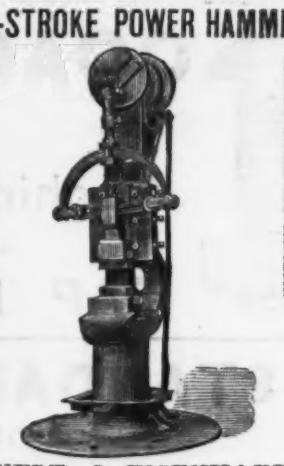

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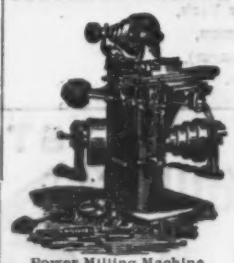

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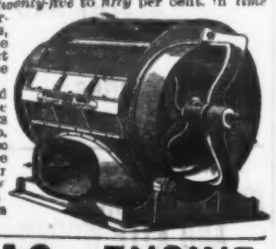

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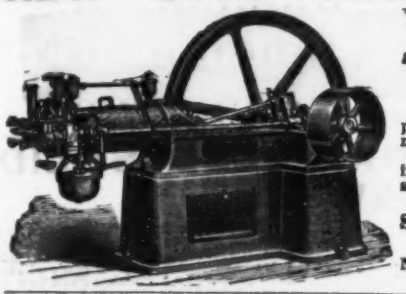

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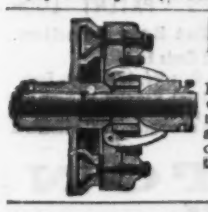

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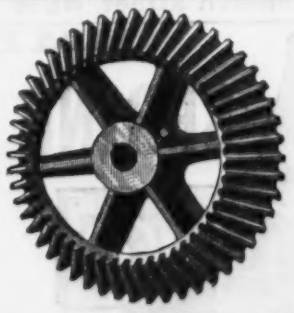

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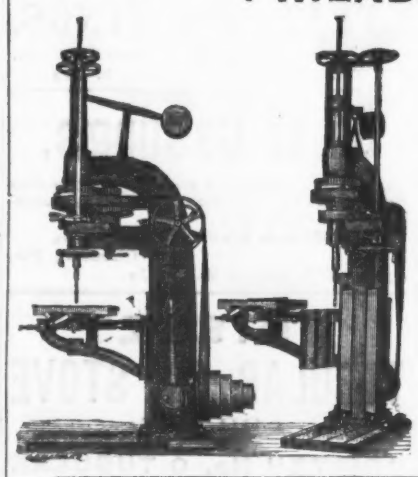

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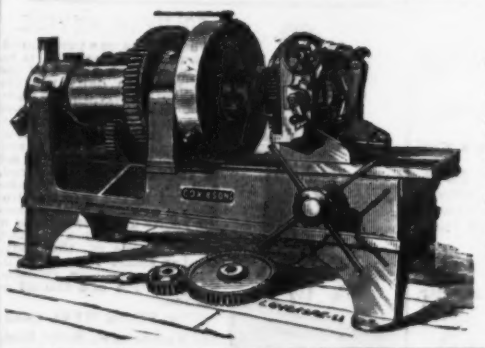

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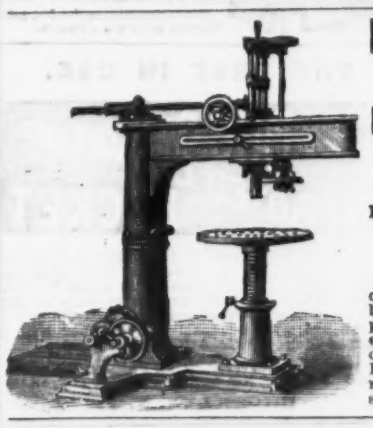

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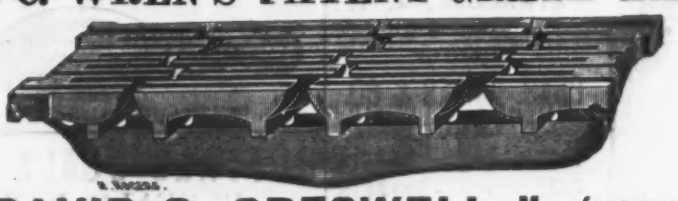

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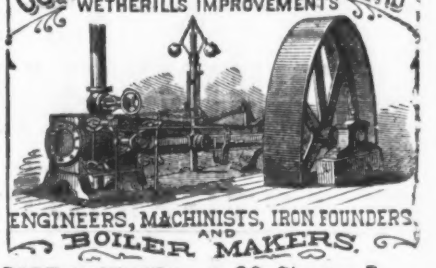

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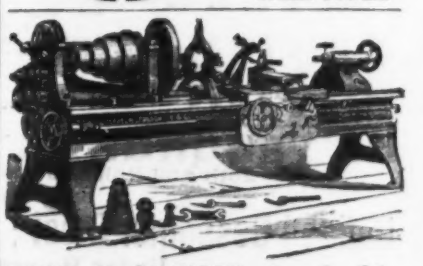

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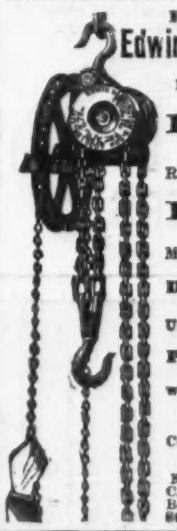

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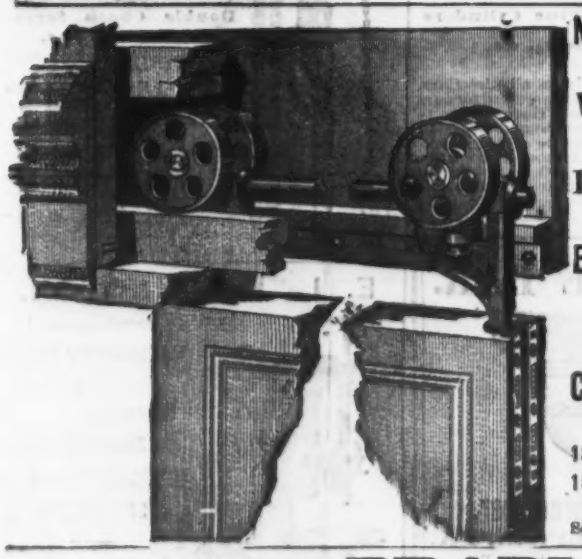

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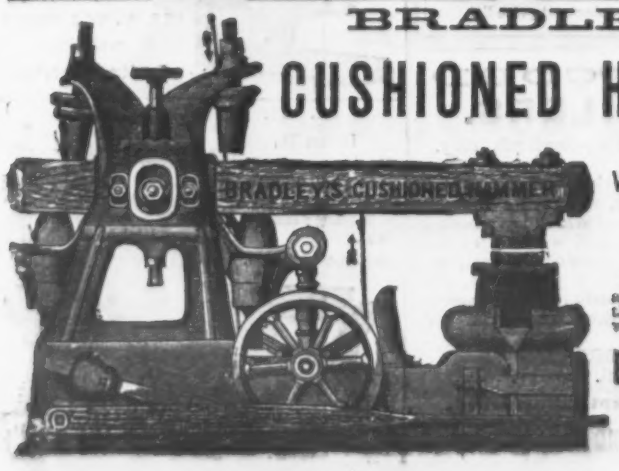

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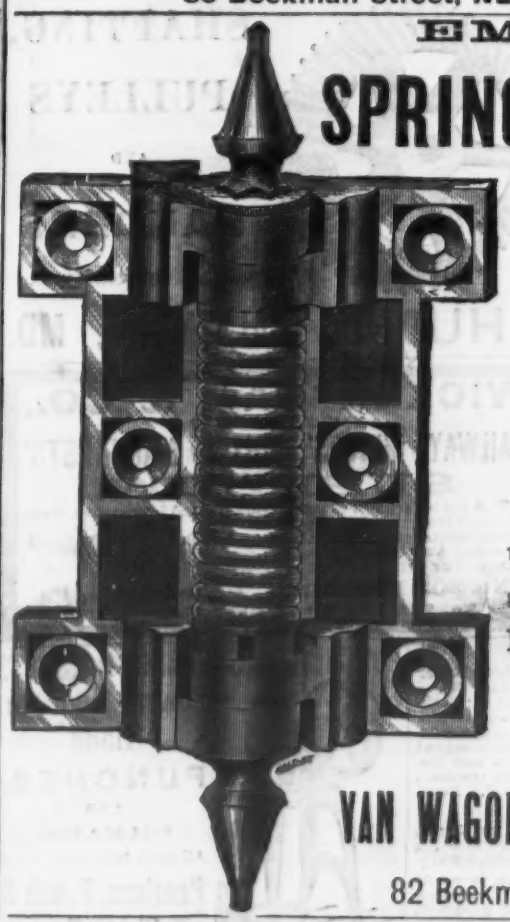

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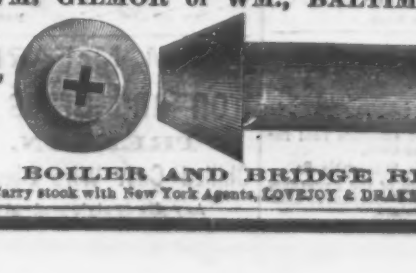

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